Emergency Blood Services

CANADA
EHS

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EMERGENCY BLOOD SERVICES

EMERGENCY HEALTH SERVICES DIVISION

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FOREWORD

This is one of a series of manuals which outline the recommended organization, operation and administration of Emergency Medical Units for use in a major disaster.

The Advanced Treatment Centre, the Emergency Hospital, and the Emergency Clinic, are designed to supplement and expand the casualty care services normally provided by existing hospitals. These units will be activated when large numbers of casualties create a demand for equipment and services, greatly exceeding the existing treatment resources.

The quantity of blood needed in an immediate post-disaster period, and a continuing demand for blood thereafter, would also place demands on existing blood services beyond their peacetime capability.

It has been necessary therefore, to plan for provision of blood in major peacetime or wartime disasters. This manual has been prepared with the assistance of the Canadian Red Cross Blood Transfusion Service to guide Emergency Health Services personnel in the planning, organization, and operation of an Emergency Blood Service in such disasters.

CONTENTS

ANNEXES

LIST OF ILLUSTRATIONS

EMERGENCY HEALTH SERVICES PLANNING FOR CASUALTY CARE

INTRODUCTION

The need for an active Emergency Health Services (EHS) organization in Canada is determined by the anticipated effects of nuclear weapon attack. Such an attack will give rise to a rapidly increasing medical workload, the increase occurring in three stages from: –

1. Casualties created by the effects of blast and heat,
2. Casualties created by the effects of radiation,
3. Epidemics resulting from social and economic disorganization.

Emergency Health Services plans, to receive and treat large numbers of such casualties from a disaster area, will require the application of proven principles of mass casualty care. By these means, an apparently overwhelming task can be reduced to one of manageable proportions. The development of such plans has been influenced by the extensive experience of the military medical services. Their experience has resulted in the establishment of the Principles of Mass Casualty Care, which can and should be used in major civilian disasters.

PRINCIPLES OF MASS CASUALTY CARE

1. **The establishment of echelons of medical care.** Casualties are brought back over long distances, with various halts to provide sustaining care and shelter at echelons (or stages) on this journey. A system of progressive care is instituted at these various echelons.

2. **The practice of sorting casualties into priorities for evacuation and for treatment at each echelon.** This is based on the principle of accomplishing the greatest good for the greatest number of injured. Casualties are sorted into a number of categories – minimal, immediate, delayed and expectant.

a) Minimal. Casualties classified as minor may be some 40% of the total casualties. Once treated, many of these persons could help with the workload.

b) Immediate. It may be estimated that some 20% of casualties, which are designated as "immediate", will be of such a nature that by short, life-saving surgical procedures they may be returned to health and effectiveness in a relatively short time.

c) Delayed. Some 20% of casualties may be classified as "delayed" – those persons with injuries in which treatment may be delayed for a period of time without loss of life, although there will be an increased morbidity (fractures are examples of this type).

d) Expectant. About 20% of casualties may be classified as "expectant", that is, casualties whose injuries are such that they will require too much time and effort of medical personnel in their treatment, during the initial stages of a disaster situation, to produce a satisfactory outcome for the patient. An example would be an adult with 60% body-surface burns.

Casualties classified as "delayed" or "expectant" will be given supportive treatment until such time as the medical situation will permit a full measure of treatment such as would be given in a peacetime situation, when medical personnel, supplies and equipment are maximal.

3. **The standardization of treatment at each echelon of medical care.** There will be a discrepancy between the treatment workload and the number of medical and nursing personnel available. The capabilities of these persons must be used in the most economical manner. There will also be a discrepancy between the amount of medical materiel available and the amount needed. As it is not possible to stockpile all drugs and equipment, items are selected on the understanding that standard care will be introduced.

4. **The provision of early resuscitation and life-saving surgery.** The highest priority is given to provision of early emergency medical care to ensure survival of the most seriously injured until they reach definitive care facilities. The time required to perform the surgical procedure must be relatively short. There must be a reasonably good chance of a successful outcome for the patient.

5. **Application of specific surgical techniques in the treatment of wounds.** These are outlined in some detail in the Nato Handbook "Emergency War Surgery" which has been distributed free to every doctor in Canada.

It is chiefly through these five established principles that it has been possible to raise the survival rate of casualties reaching the care of military medical services

from the basic rate of 83.3% in the Crimean War, to the rate of 96.4% in the Korean War.

Should Canada be attacked by an enemy using nuclear weapons, medical and hospital care resources will be faced with the immense task of caring for many thousands of casualties. In the absence of good planning it must be expected that some 20% of the casualties who are rescued will die from lack of medical care. Many more will remain disabled. With careful planning, the survival rate established in the Korean War can be maintained.

In Canada EHS plans call for the deployment of Advanced Treatment Centres to provide sustaining or second echelon care, so that serious casualties may survive the journey back to hospitals in neighbouring communities. These hospitals, supported by the 200-bed Emergency Hospitals from the national stockpile, will form the third echelon of care, that of life-saving surgery.

Minor casualties usually constitute almost half the total workload. Having received first aid at the disaster site their continuing care will be carried out at Emergency Clinics and their accomodation arranged by Emergency Welfare Services.

NATIONAL MEDICAL STOCKPILE

To ensure that adequate medical equipment is available in times of disaster, the federal government has authorized the establishment of a national stockpile of health supplies and equipment. The stockpile contains the following packaged units:

2800 Hospital Disaster Kits

630 Casualty Collecting Units

630 Advanced Treatment Centres

200 Emergency Hospitals

20 Public Health Laboratories #

200 Emergency Clinics #

28 Emergency Blood Shadow Depots*

600 Blood Donor Packs.

In addition, the provision of an Emergency Blood Service in any major disaster is an essential element of Emergency Health Services planning for mass casualty care.

*NOTE – The terms Emergency Blood Shadow Depot and Shadow Depot are synonymous. #Medical stockpile items still incomplete

PEACETIME DISASTERS

General

The Canadian Red Cross Blood Transfusion Service is responsible for the supply of whole blood and blood components to all hospitals in Canada. The donor procurement service is responsible for the organization of volunteer blood donor clinics in industry, residential areas and permanent clinics. Once clinics have been arranged, the technical services are responsible for the collection, processing, storage and distribution of blood to all hospitals.

Normal Blood Supply

Blood Shadow Depots, which are strategically situated across the country, form the basis for the technical programme of the Red Cross Blood Transfusion Service. All provinces have a least one Depot while some have more, dependent entirely upon the area of responsibility. In addition to the normal supply of blood to hospitals through Blood Transfusion Service Depots, each local branch of the Canadian Red Cross maintains a Blood Donor Panel, from which it can make available blood donations in times of need. Such persons are known as "walking" donors and can be called upon at any time, day or night to give blood. The necessary equipment for the emergency bleeding of walking donors by local hospitals, is provided by the Canadian Red Cross Blood Transfusion Service, through the Depots responsible for normal supply. The provision of equipment for this purpose applies in particular, to hospitals in the more remote areas.

Fractionation Products

Blood plasma fractionation products, of which albumin is the most important for use as a whole blood substitute in emergency situations, are produced from out-dated blood. Production is on a national basis for distribution to hospitals through Blood Transfusion Service Depots; a limited reserve is maintained at the Blood Transfusion Service National Headquarters. Albumin should be considered by all hospitals as a supplement, rather than an alternative, to the normal physiological plasma expanders of which each hospital should maintain an adequate supply.

Blood Supplies in Disaster

MINOR DISASTER

Designation of a peacetime disaster as "Minor" or "Major" is not practicable insofar as the requirements for blood and blood components are concerned. These requirements must be assessed by the medical authority of the

Disaster Planning Committee of the community concerned. This assessment must be carried out on a systematic basis and should consist of an examination of the following factors: –

1. Number of casualties requiring plasma expanders, albumin, whole blood, or blood fractions
2. Available reserves in local hospitals
3. Time factor for supply of requirements from the relevant Blood Transfusion Service Depot
4. Availability of blood donors by group and type from local blood donor panels. Walking donors should be called only if the time factor precludes supply from the Blood Transfusion Service Depot.

A minor disaster is unlikely to involve the use of the "100 Blood Donor Packs" provided to hospitals by the Emergency Health Services.

MAJOR DISASTER

A major peacetime disaster may be considered one which has resulted in casualties which exceeds the local potential to provide an adequate supply of blood and blood components.

Organized on a national basis, the Blood Transfusion Service is able to utilize the facilities of its 16 Blood Transfusion Service Depots, for the provision of blood and blood components. It establishes emergency blood collecting clinics where and when found necessary.

SUMMARY

1. Classification of peacetime disaster as minor or major is dependent on the number of casualties and the local potential for the provision of blood and blood components
2 Requirements for blood and blood components following a disaster must be assessed by the medical authority of the affected area.
3. It is likely that in most peacetime disasters, the Canadian Red Cross Blood Transfusion Service Depot, which normally supplies the hospital (s) of the area concerned, will be able to provide supplies of blood for use by the hospitals
4. The resources of the Canadian Red Cross Blood Transfusion Service are available on a national basis for the provision of blood and/or blood components for large scale casualties resulting from a major disaster

5 The use of the 100 blood donor packs supplied to hospitals by the Emergency Health Services will seldom be required for minor disasters. These should be retained for use by hospitals under circumstances which preclude other methods of supply.

PLANNING FOR EMERGENCY BLOOD SERVICES

OBJECTIVES

The Emergency Blood Services programme has the following objectives:

1. To organize a whole-blood procurement and distribution programme which can be mobilized rapidly to meet emergency situations

2. To supplement this whole-blood programme with plasma volume expanders, glucose and saline mixtures

3. To provide for the procurement and storage of supplies and equipment required for the emergency blood programme

4. To recommend the staffing pattern and methods of training of personnel.

ESTIMATE OF NEED FOR TRANSFUSION MATERIEL

An estimation of the amount of transfusion materiel required for the emergency blood programme has been computed on the basis of some 200,000 seriously-injured casualties reaching hospitals. As three units of blood or plasma expander would be required for each casualty surviving after the first day, it is estimated that 600,000 units must be made available. The transfusion supplies recommended and proportions required for emergency use are:

50% as whole blood,

50% as plasma volume expanders.

During the period immediately following a wartime disaster, it would be necessary to rely chiefly on plasma volume expanders. Whole blood, however, must be supplied to the seriously injured as rapidly as possible. It is considered, therefore, that 300,000 units of whole blood will be required. A "unit" is one bag (pack) of 450 grams of whole blood with 67.5 ml. of anti-coagulant.

BASIC FACTORS UNDERLYING EMERGENCY BLOOD SERVICES PLANNING

Federal Emergency Health Services Planners for emergency blood services recognize the following facts:

1. At present Red Cross Blood Transfusion Depots are located mainly in potential target areas

2. The normal reserve of whole blood in blood banks would be inadequate to meet the demands

3. During the immediate post-disaster period it would be difficult to mobilize blood-collecting facilities in the vicinity of disaster. Support from other communities during this phase would therefore be of paramount importance

4. It is not practical to stockpile whole blood because of loss due to deterioration

5. The difficulty of producing sufficient quantities of blood derivatives precludes the possibility of stockpiling adequate quantities of these supplies.

Planning must therefore be based on:

a) Stockpiling of plasma volume expanders in strategic centres, for immediate use. This has been accomplished, by those hospitals which have an approved hospital disaster plan, through receipt of hospital disaster supplies. The prepositioned Emergency Hospitals also contain a large supply of Dextran

b) Collecting and shipping large quantities of whole blood from centres located beyond the disaster area to meet the immediate and continuing demands of the emergency

c) Stockpiling of equipment and supplies for twenty-eight Blood Shadow Depots, which has been completed

d) Placement of 100 Blood Donor Packs which are being distributed to existing hospitals and are included in the Emergency Hospitals.

FRAMEWORK OF THE PLAN

Emergency Health Services will establish centres known as Blood Shadow Depots for the emergency bleeding of donors on a nation-wide basis. Shadow Depots will be sited approximately 75 miles from any known target area. They will be established where the concentration of population ensures large numbers of donors. The Shadow Depots will be associated with existing Red Cross Transfusion Service Depots. The Shadow Depots will not interfere with the peacetime programme of the Red Cross, but will be capable of replacing parent depots in a national emergency. The Canadian Red Cross Blood Transfusion Service has agreed to assist with the organization and

operation of these Shadow Depots as well as the training and supervision of their personnel.

DONORS

1. **Advanced Grouping of Potential Donors.** Donor panels should be built around existing donor-groups contributing to the present Red Cross Blood Transfusion Services Programme.

This will permit an accurate assessment of donor potential. Information on available donors will be supplied by the Canadian Red Cross to local Blood Service Officers, permitting them to arrange a potential donor pool for each Shadow Depot.

The purpose of this pool would be to identify in advance a reasonable number of group "O" donors who will be available for bleeding in the designated emergency centres. This simplifies the provision of an initial supply of group "O" blood and reduces the number of donors who must be processed to meet emergency requirements.

Mass grouping and typing of the population in peacetime is not recommended because of errors and subsequent transfusion accidents. Only the limited grouping programme described above is advisable as an emergency health service procedure.

2. **Serological Testing** of blood for syphilis during the immediate post-disaster period will not be carried out. The possibility of infection from this source will have to be accepted as a calculated risk justified by the nature of the circumstances at that time.

3. **Donors from a Fallout Area** may be accepted if they are free from the clinical symptoms of radiation sickness and meet the ordinary criteria for the giving of blood.

NOTE: Transfusion of casualties is not a part of the Emergency Blood Services Programme. Emergency Blood Services provide only for collection and delivery of grouped and typed blood to the appropriate medical units.

ORGANIZATION OF EMERGENCY BLOOD SERVICES

MEDICAL DIRECTORS

A medical director of Emergency Blood Services should be appointed for each province by the Provincial Director of Emergency Health Services. In most cases, this will be the physician in charge of existing blood transfusion services. He will serve under the Director of Emergency Health Services and be responsible for the development and co-ordination of the provincial Emergency Blood Services programme.

In certain areas, the arrangements for peacetime collection of blood overlap provincial boundaries. It will be important for provincial medical directors of Emergency Blood Services to integrate such peacetime plans into the overall national pattern.

Similarly, medical directors should be appointed by the Provincial Emergency Health Services Director in cooperation with the Provincial Medical Director of Emergency Blood Services in those communities in which there are existing blood services or where Shadow Depots will be established. These physicians will be responsible for the development of the local programme within the overall framework of zone, provincial and federal emergency planning.

PERSONNEL OF A SHADOW DEPOT

Each Shadow Depot will have a headquarters staff and three collection units.

HEADQUARTERS STAFF:

A physician should be appointed to act as full-time director of the Shadow Depot.

The total staff required for each twelve-hour shift is as follows:

Health Supplies Officer – a pharmacist to be in charge of all supply activities including receiving, packaging and shipping and to assist with administration.	1
Nurse Supervisor – to supervise all nursing duties including production of sterile supplies.	1
Senior Technician – to supervise technicians' duties	1
Technicians	8
Laboratory Assistant	1
Clinic Assistants	4
Clerk-Typist	1
Transport Officer	1
Porters	6
Total	24

COLLECTION UNITS

Each collection unit will consist of three collecting teams with their equipment and supplies. They will be based at the Shadow Depot from which they will proceed as mobile groups to centres in the immediate area where they will hold blood clinics.

COLLECTING TEAMS

There will be nine collecting teams supplying blood to each Shadow Depot. The collecting teams will operate the blood clinics. The three teams in each unit would provide continuous operation of the clinic by working eight hour shifts.

Each collecting team will be composed of:

Nurses			2
Technician			1
Clinic Assistants –	assistant for beds	3	5
	assistant for preparation table	1	
	scrub assistant	1	
Receptionist			1
Clerk-Typist			1
Rest Room Volunteers			2
Canteen Volunteers			2
Volunteers for sealing			2
Transport Drivers			3
Other Drivers – team members with cars			
Total			19

TOTAL STAFF FOR A SHADOW DEPOT
(24 hours)

			Total
Physician	– H.Q. Staff	1	1
Health Supplies Officers	– H.Q. Staff	2	2
Nurses	– H.Q. Supervisors	2	
	Donor Nurses	18	20
Technicians	– H.Q. Supervisors	2	
	H.Q. Technicians	16	
	Team Technicians	9	27
Laboratory Assistants	– H.Q. Staff	2	2
Clinic Assistants	– H.Q. Staff	8	
	Team Staff	45	53
Clerk-Typists	– H.Q. Staff	2	
	Team Staff	9	11
Transport Officers	– H.Q. Staff	2	2
Transport Drivers	– Team Staff	27	27
Porters	– H.Q. Staff	12	12
Volunteers	– Receptionists	9	
	Rest Room Volunteers	18	
	Canteen Volunteers	18	
	Volunteers for sealing	18	63
Total Shadow Depot Staff			220

TRAINING PROGRAMME

In order to function efficiently during an emergency it is essential to have trained and experienced personnel assigned in advance for the emergency blood services.

Technicians

Technicians with training and experience in blood bank technique will be needed to man the Shadow Depots, along with other suitably trained persons. To ensure that each Shadow Depot has sufficient personnel on hand in an emergency, full use will be made of experienced Red Cross alumnae, i.e. women who have served in Red Cross depots in the past and who have left the Service for various reasons.

Nursing Personnel

Here again it is proposed to make use of Red Cross alumnae by locating and assigning them for duty in specific areas where a Shadow Depot will be established. During the ordinary routine of Red Cross Blood clinics they will be able to participate and refresh their knowledge and techniques. As it takes two to three months to train a nurse in the technique of bleeding donors, it is not practical for the Red Cross to operate a peace-time training programme for nurses. Some schools of nursing are providing basic training and experience in venepuncture technique for their students, to familiarize them with this technique. Nurses who are members of hospital blood teams will be an excellent source of personnel.

Clinic Assistants

Clinic assistants are required to help in the routine operation of the clinics. They can be trained without difficulty during regular Red Cross clinics in the area where it is proposed to establish a Shadow Depot.

Volunteers

These may be designated in advance and given the opportunity of participating in the operation of routine blood clinics.

The training programme should be organized in three phases, i.e. individual training, functional area training, and unit training, to ensure that all staff are aware of their particular roles and responsibilities.

Maintenance

It is suggested that maintenance staff – a carpenter, electrician and steam-fitter or plumber be assigned to each Shadow Depot. These and all other maintenance requirements must be arranged locally.

Transportation

In order that a Shadow Depot may function properly, motor vehicles must be assigned by the local Co-ordinator of Municipal Emergency Measures Organization to the Depot for use, as long as they are required, and in the number suggested below. In wartime these functions are assumed by the Municipal Controller of road transport.

SHADOW DEPOT HEADQUARTERS:

1. Four or more private cars for personnel – These could probably be provided by the staff of the Depot
2. One panel truck
3. One refrigerator van (milk or fruit) – This van, of some 600 cu. ft. capacity, should have controlled refrigeration so that it could be used as a walk-in refrigerator for storage of whole blood at 38° to 40°F.

Note: Emergency Welfare Services will be responsible for the arrangements for feeding the staff of the Emergency Blood Shadow Depot.

COLLECTION UNIT:

1. Four or six private cars for personnel

2. Two 2 ½ ton vans for transportation of supplies and equipment from and to the Shadow Depot

3. Two refrigerated trucks – These will be used as storage refrigerators at the Collection Unit location. They will carry the whole blood from the Collection Unit to the Shadow Depot. Each truck should be capable of moving 34 cartons (approx. 24 cu. ft.) or a total of 408 bags (packs) of blood at 38° to 40F°.

All transportation arrangements should be made by the Transport Officer in co-operation with the Health Supplies Officer.

The logistics of all supplies and equipment for a Shadow Depot may be obtained from the Technical Guide for Health Supplies Officers in a Blood Shadow Depot. This guide will be available to provincial Emergency Health Services for planning purposes.

SELECTION OF PREMISES

SITING OF SHADOW DEPOTS

Arrangements should be made by the provincial Emergency Health Services authorities in conjunction with the Red Cross Blood Transfusion Service, regarding premises for the Shadow Depots.

When operational requirements demand that sites and buildings for use as Shadow Depots must be located in a risk area, the advice of the local EMO Co-ordinator, Municipal Engineering Department and the Radiation Defence Officer should be sought, to ensure that optimum protection is obtained against direct weapon effects and fallout radiation. The Health Supplies Officer of the Shadow Depot should be consulted also, as his advice would be helpful on the following:

1. Selecting a building which could be used as a storage area during pre-positioning of Shadow Depot supplies and equipment

2. Ascertaining if a building would be suitable for the complete operation of the Shadow Depot which includes receiving, banking, packaging and issuing of whole blood and other supplies.

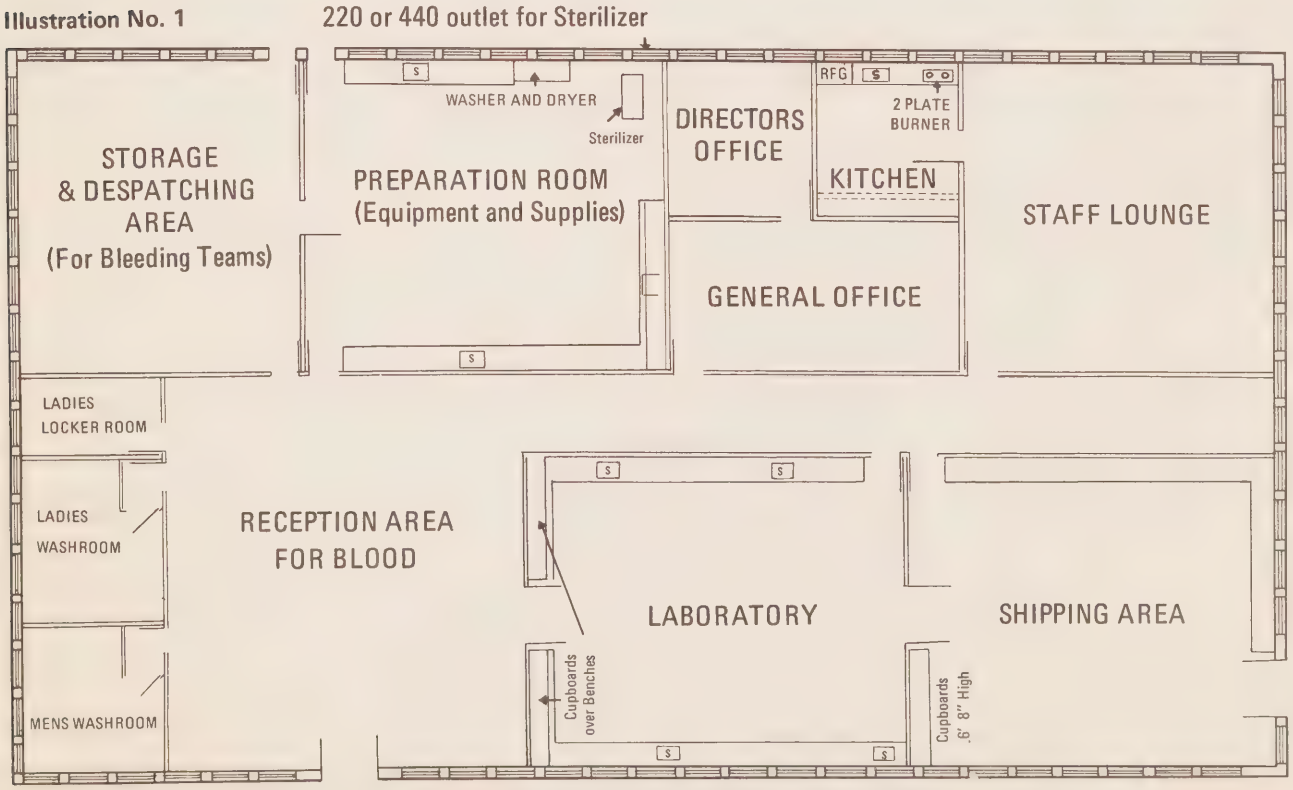
In many instances the premises regularly used for mobile clinics would be most suitable. If these peacetime sites are not considered suitable under disaster conditons, then other accommodation providing adequate facilities should be designated for this emergency service. Refrigeration should be made available.

A suggested floor plan for a Shadow Depot is shown as Illustration 1 (below). A minimum of 10,000 square feet of space is required for a Depot.

UTILITIES

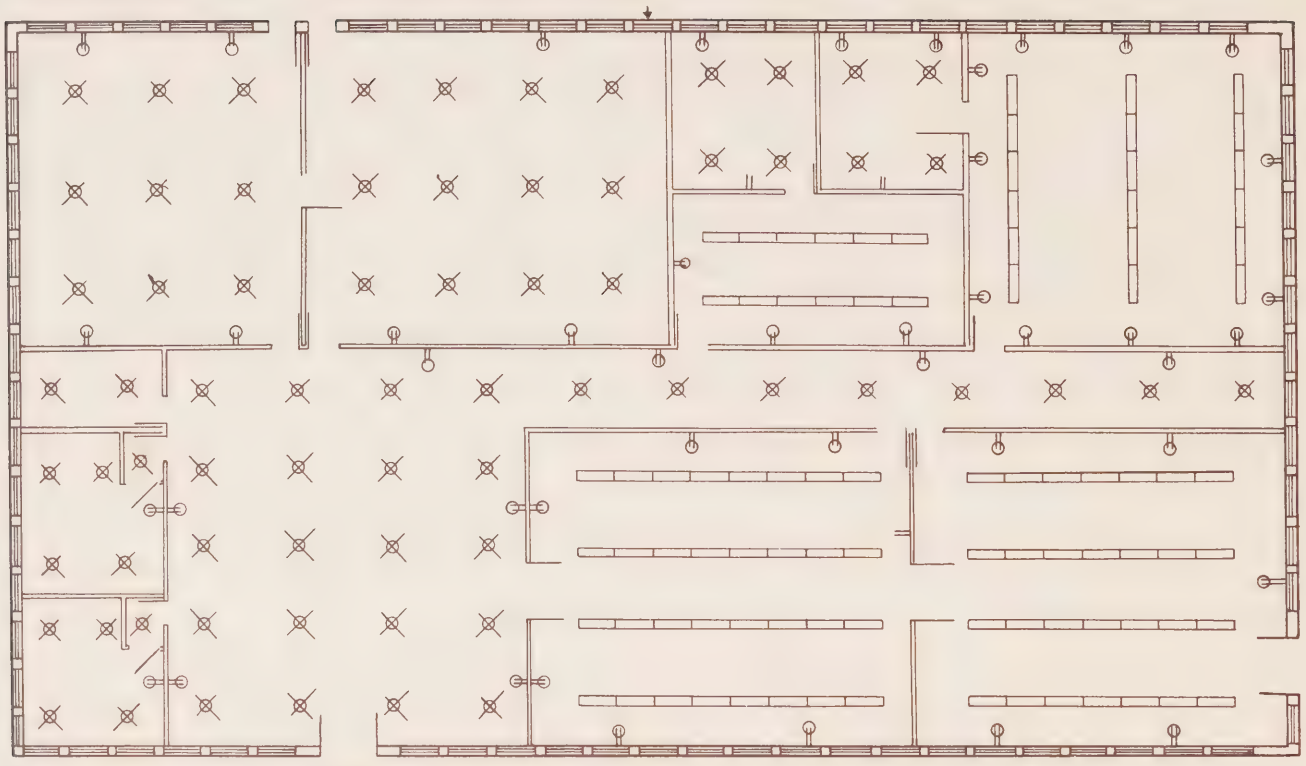
Normal heating and sanitary arrangements would be necessary at the depots. An adequate water supply for washing of equipment, sterilization and laboratory purposes is required.

Illustration No. 1



SUGGESTED FLOOR PLAN OF EMERGENCY BLOOD SERVICES SHADOW DEPOT

Illustration No. 2



SUGGESTED ELECTRICAL REQUIREMENTS FOR AN EMERGENCY BLOOD SHADOW DEPOT

A suggested plan of the electrical supply required in a Shadow Depot is shown in Illustration No. 2 (above).

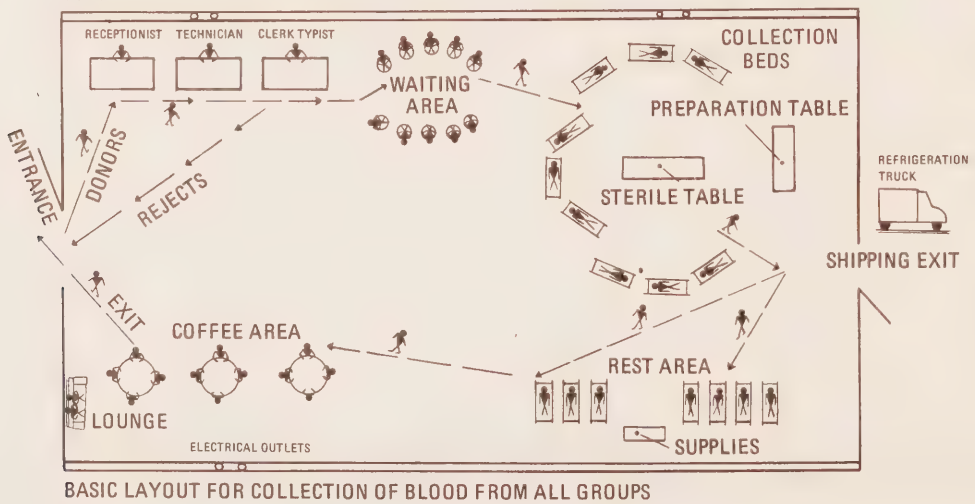
COLLECTING TEAMS

The layout for the collection of blood by a collecting team is shown in Illustration No. 3 (below). This floor plan arrangement demonstrates the manner in which blood could be collected from all groups.

Sixteen beds are supplied for each Collection Unit. Nine beds will be set up in the donor area and the balance in the rest area. If additional beds are required for the rest area they would have to be obtained locally.

An area of approximately 2400 square feet on one level is necessary to accommodate this layout.

Illustration No. 3



BASIC LAYOUT FOR COLLECTION OF BLOOD FROM ALL GROUPS

OPERATIONS OF EMERGENCY BLOOD SERVICES

ACTIVATION OF SHADOW DEPOTS

Shadow Depots will be activated immediately following a major disaster.

When a Shadow Depot becomes operational the Health Supplies Officer will arrange removal and distribution of the supplies from storage to the functional areas of the Depot.

If at the time of a disaster, Shadow Depot supplies have not been released to provincial control, the Health Supplies Officer will arrange with the zone or local Health Supplies Officer for issue from federal storage.

Shadow Depot Headquarters staff will position their equipment and supplies; arrange sterilization of the equipment required by the collecting teams; prepare to receive and bank blood; and to group and type it by the methods described in Chapter VIII.

The senior person in charge of each collection unit will draw from the Depot the unit supplies shown in List 2 (Annex 1). He will also ensure that the person in charge of each collecting team is issued with team supplies in List 3, (Annex 1).

When collecting teams leave the Shadow Depot for the centres where the blood clinics are to be held, each team will take from the Depot:

1. Collecting team supplies
2. One set of sterile supplies (Chapter VI, Page 18)
3. One set of collecting team supplies – non-sterile, (Chapter VI, Page 19)

Following collection, blood will be despatched by team transport to the Shadow Depot. Here it will be grouped, typed and banked for shipment on demand in refrigerated transport to medical facilities.

Shadow Depot routine procedures are shown in Chapter VI.

PHASED PROGRAMME FOR EMERGENCY BLOOD COLLECTION

The Emergency Blood Services Programme should be operated in two main phases.

First Phase

1. AT THE SHADOW DEPOT

The first step will be to bleed only Group "O" donors. Group "O" blood can, in most instances, be given safely to a recipient without cross-matching. This type of blood will be available in relatively large quantities for administration to mass casualties in the immediate post-disaster phase. The regular donors with Group "O" blood who present themselves with their Red Cross cards would be bled at once. Persons who state they are Group "O" but have no confirmatory card will be grouped and bled immediately by the technician. Those persons with blood groups other than Group "O", as indicated by their cards or grouping by the technician, will be asked to return later. No typing will be done during this phase unless time permits.

2. 100 BLOOD DONOR PACKS AT THE HOSPITALS

As a further means of meeting this contingency the Federal Emergency Health Services, in consultation with the Canadian Red Cross Blood Transfusion Service, has developed a 100 Blood Donor Pack. This Pack contains the items of equipment necessary to reinforce a hospital's blood procurement capability.

The packs are being distributed by Federal Emergency Health Services on the recommendation of the Provincial Director of Emergency Health Services. They are being sent to existing hospitals, of over 50 beds, which are situated between 25 and 100 miles from civilian target areas. Distribution is based on the classification of the hospitals and the rated bed capacity.

Each Emergency Hospital in the national medical stockpile contains one pack.

There is a small provincial and federal reserve to meet other possible demands.

Second Phase

This phase commences when hospitals indicate that they have sufficient time and facilities to undertake cross-matching. Bleeding, grouping and typing of all donors will be carried out during this phase.

SHADOW DEPOT ROUTINE PROCEDURES

PREPARATION AREA

Cleaning

Stainless steel instruments and equipment, glassware and wooden stands will be cleaned in this area.

Arrangements should be made locally, preferably in close proximity to the Shadow Depot, for the laundering of gowns and dressing sheets by volunteers.

Assembling.

Equipment is assembled for sterilization in this area. The packets prepared should contain the supplies listed below:–

Sterilization.

Sterile equipment required by a Collecting Team to cover an 8-hour period:

1. BASIN AND TRAY PACKET – see illustration No. 4 (below)

   3 large solution basins (14 1/2" in diameter)

   1 large instrument tray (19" X 13")

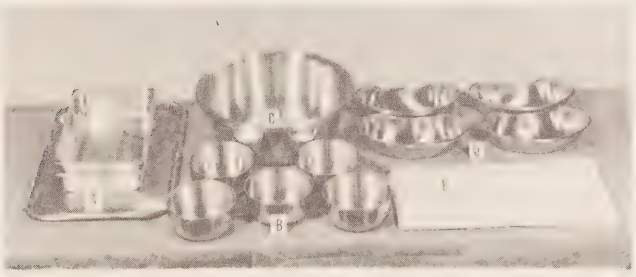
   2 instrument trays (12 1/4" X 7 3/4" X 2 1/4")

   5 dressing basins (6" X 2 1/2")

   4 kidney basins (10")

   1 cover, white cotton (36" X 36")

Illustration No. 4



BASIN AND TRAY PACKET

A. 1 large instrument tray
   2 small instrument trays
B. 5 dressing basins
C. 3 large solution basins
D. 4 kidney basins
E. 1 white cotton cover

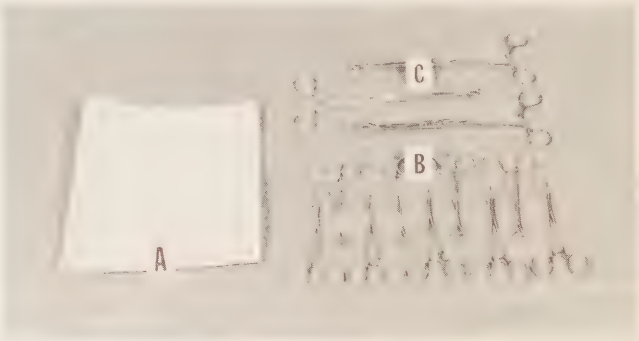
2. INSTRUMENT PACKET – see illustration No. 5 (below)

   3 sponge forceps, holding, regular, straight. (9")

   9 towel clips, Backhaus (5")

   1 cover, white cotton (18" X 18").

Illustration No. 5

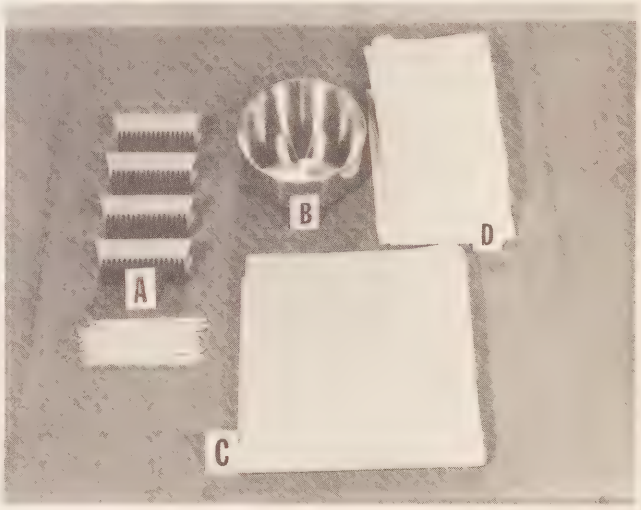


INSTRUMENT PACKET

A. 1 white cotton cover
B. 9 towel clips
C. 3 sponge forceps

3. SCRUB PACKET – See illustration No. 6 (below)

Illustration No. 6



SCRUB PACKET

A. 4 hand brushes and sticks
B. 1 dressing basin
C. 1 white cotton cover
D. 4 hand towels

1 basin, dressing, round (6" X 2 1/2")

4 brushes, hand

4 sticks, orangewood (6")

4 towels, hand, cotton, green (20" X 40")

1 cover, white cotton (18" X 18").

4. COMBINED LINEN PACKET – see illustration No. 7 (page 24)

   6 towels, hand, cotton, green in package (20" X 40")

   6 dressing sheets (36" X 36")

   4 gowns, operating, green, size 36

   1 cover, white cotton (36" X 36").

Illustration No. 7

COMBINED LINEN PACKET

A. 1 white cotton cover
B. 4 operating room gowns
C. 6 dressing sheets
D. 6 hand towels
E. Wrapped Combined Linen Packet

5. OTHER STERILE SUPPLIES –

   408 bags, blood collecting and dispensing, 450ml., with donor tube and anti-coagulant

   17 packages transfusion towels – 25 per bag (to be sterilized before issue).

6. NON-STERILE SUPPLIES –

   3 dressing sheets (80" X 90") surgically clean

   3 lengths of polyvinyl film, 6' in length.

RECEPTION AREA

On receipt of a shipment of blood, the porters working under the direction of the supplies officer, will assist the transport drivers in sorting the equipment and blood sent in by the collecting teams. All blood specimens should be given to the technicians and all blood placed in refrigeration. The used equipment would be taken to the cleaning and sterilization area.

The transport drivers would than be issued with fresh supplies and equipment and return to the collecting teams.

LABORATORY AREA

In this area the blood is received and banked by the technicians using the technique described below:

METHOD:

Tile tests will be used throughout all phases. This is a calculated risk justified under the circumstances.

Anti-A, Anti-B and Anti-A+B, will be used to "prove" Group "O" donations during Phase I. Anti-A+B may be used alone if pressure is acute. Anti-A and Anti-B will be used for all groups in Phase II.

Anti-A+B may be used in addition for Group "O" only. The method is described in Chapter VIII.

In Phase II all donations will be tested with Anti-D by a slide method described in Chapter VIII.

TEAM ROUTINES FOR COLLECTING BLOOD*

BLOOD BAGS (PACKS) – Description

With the introduction of plastic blood bags to replace blood bottles it has been necessary to change the procedure, technique and equipment required for the collection of blood. The plastic blood bags provide for a "closed" system, with the donor tubing sealed into segments for crossmatch purposes. The complete equipment for use with the blood bags (packs) is as follows:

Plastic blood bags – single	Scale
Forceps covered with plastic tubing	Metal Hook
Vacutainers – dry	Hand sealer and clips
Tube-stripper	Blood bag cartons

The plastic blood bags are packed in cans (single – 6 per can). The cans should be opened by the Collecting team, prior to clinics. The blood bags are removed from the cans and placed in the tray on the Preparation Table. Unused open cans should be clearly marked with the date of opening, as the bags must be used within thirty days. Unopened cans may be stored for three years. As the plastic blood bags are filled and processed they should be placed in the blood bag carton, twelve bags in each carton, for return to the Blood Shadow Depot. All cartons should be checked for sharp edges as plastic is easily punctured if not handled with care. Sharp instruments should be removed from areas where plastic blood bags are processed.

Note: SMOKING MUST BE PROHIBITED FOR ALL STAFF WHEN WORKING WITH PLASTICS – CIGARETTE ASH WILL BURN HOLES IN THE PLASTIC.

The donor tubing attached to the blood bags is filled with anti-coagulant solution at the time of manufacture. The solution is held in the tubing by a metal bead at the entrance to the blood bag. Care must be taken not to remove the bead until the venepuncture has been made.

Forceps with serrated jaws, are used on the donor tubing. These jaws have been covered with plastic tubing to prevent damage to the donor tubing when applied.

Collecting scales are used to weigh the amount of blood in the blood bag. It is not possible to ascertain the correct amount of blood by visual means. These scales are hung at the side of the donor bed by means of a metal hook fixed on the bed. The blood bag is then suspended from the hook at the bottom of the scales using the small hole between the two infusion ports in the top of the blood bag. The black rubber weight indicator must be set at zero (0) shown on the scale. When the indicator reads 450 grams the blood donation is complete (See illustration Nos. 10, 11, 12 Pages 22, 23)

Note: IT IS IMPORTANT NOT TO OVERFILL THE BAG AS IT ONLY CONTAINS SUFFICIENT ANTI-COAGULANT FOR A 450 GRAM DONATION OF BLOOD.

THE IMPORTANCE OF THOROUGHLY MIXING THE ANTI-COAGULANT SOLUTION CANNOT BE OVER-EMPHASIZED. THIS ACTION MUST BE REPEATED MANY TIMES DURING THE DONATION TO ELIMINATE THE FORMATION OF CLOTS.

TEAM ROUTINE TO OBTAIN GROUP "O" BLOOD – PHASE 1

Personnel Assignment and Duties According to Areas:

Reception Area

VOLUNTEER RECEPTIONIST – 1

Duties.

1. Maintain order at entrance
2. Direct all persons having donor cards denoting Group "O" as well as all persons having no card, to the technician
3. If persons having donor cards denoting A, B or AB groups inadvertently turn up at this clinic, they should be requested to return on the following day.

* Ref: Routine Nursing Procedures - Canadian Red Cross Blood Transfusion Service, 1969

TECHNICIAN – 1

Duties.

1. Perform haemoglobin test (see illustration No. 8) "Technicians' Table" (below)
2. If haemoglobin is low (less than 12.5 grams) thank person for reporting and explain that blood cannot be taken at this time

Illustration No. 8

TECHNICIANS' TABLE – BLOOD COLLECTION UNIT

A. Lancets, applicators, bulbs and pipettes on clean table cover.
B. Opaque glass plate.
C. Absorbent cotton.
D. Wooden stands with copper sulphate vials and solutions.
E. Blood grouping sera.
F. Blood bottle labels.
G. Date stamp and pad.
H. Technicians box.
I. Paper bag for waste.

3. Those donors, whose groups are not known, are tile-grouped at this time
4. The team technician is responsible for the registration of donors; she must, therefore, supervise the clerk-typist's work and insist that the Donor Registration forms are legible and accurate
5. This team technician must also question each donor on four subjects:
   a) whether the donor is in good health, or
   b) has been under a physician's care recently, or ever had any chronic or seriously debilitating illness, or
   c) has had jaundice or malaria at any time, or
   d) has given blood within the past three months?
6. If the answer to questions c or d is yes, thank the person for reporting and explain that blood cannot be taken at this time. If the answer to questions a and b indicates that the patient has a serious health problem, the matter is referred to the nurse supervisor of the clinic for an opinion before blood is taken from the donor
7. If the answer to all of these questions is "no", give the person the appropriate label and direct this accepted donor to the waiting room
8. If for some reason, e.g. vein collapse, blood is not obtained from an accepted donor, the blood group label

must be retrieved and affixed to the Donor Registration Form with an explanatory note.

CLERK- TYPIST – 1

Duties.

Record under the appropriate heading on the "Donor Registration Form" the details concerning each donor – serial number of blood label, blood group, Rh type if known, donor's name and address.

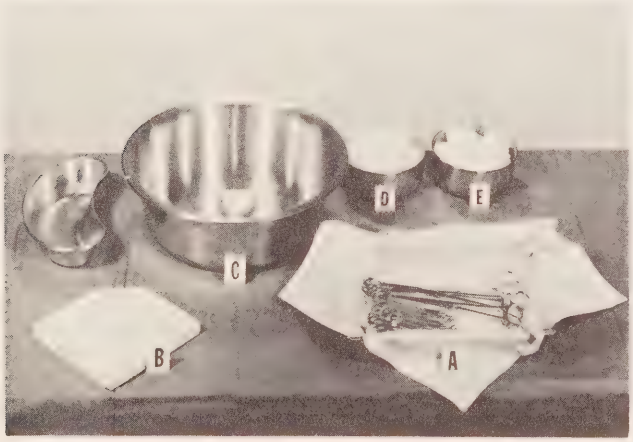
Donor Room

NURSES – 2

Duties.

1. The first nurse will supervise the general operation of the team
2. The second nurse will perform all venepunctures (see illustrations Nos. 9 and 13, "Instrument Table" and "Preparation Table", pages 22 and 24)

Illustration No. 9



INSTRUMENT TABLE

A. Sterile tray with forceps and towel clips
B. Transfusion towels
C. Basin for wash up stand
D. Absorbent sponges
E. Cotton sponges

3. The nurse or trained clinic assistant will remove the needle when the donation is completed
4. Nurses 1 and 2 will alternate duties.

CLINIC ASSISTANTS – 3 (1 for each 3 donor beds)
Duties.

1. The donor is greeted by the clinic assistant; the most suitable arm for venepuncture is selected; the donor is asked to lie on the bed; the group label is taken from the donor and placed on the bed beside the pillow
2. The sphygmomanometer cuff is applied and the pressure raised to 40 mm; the arm is now prepared for venepuncture by cleansing with alcohol and draping with a sterile towel
3. The clinic assistant collects the plastic blood bag, forceps and dry vacutainer from the Preparation Table
4. She places a wooden hand grip in the donor's hand
5. The blood bag is then suspended from the small hook on the plastic scales, using the hole in the top of the bag between the two infusion ports. The black rubber weight indicator on the scales is placed at zero (0). (See illustration No. 10 (below)

Illustration No. 10

SUSPENSION OF BLOOD BAG

This demonstrates a blood bag suspended from the small hook on the plastic scales, using the hole between the two infusion ports. The black rubber weight indicator is placed at zero (0).

6. When the nurse is ready to make the venepuncture, the clinic assistant will raise the sphygmomanometer pressure to 100 mm. and hand the venepuncture needle to the nurse holding it by the rubber shield. Care must be taken not to puncture the shield as this will contaminate the unit

7. When the venepuncture has been made the clinic assistant will immediately expel the metal bead into the blood bag (away from the port) to allow the blood to flow. (see illustration No. 11 below). The sphygmomanometer pressure is lowered to 40 mm. – 60 mm. This pressure is maintained throughout the donation

Illustration No. 11

LOCATION OF METAL BEAD AND WEIGHT INDICATOR

A close-up view showing the properly suspended blood bag, the weight indicator set at zero (0) and the small metal bead which the clinic assistant expels into the blood bag as soon as the venepuncture has been made.

8. As soon as the blood flows into the blood bag, the anticoagulant must be thoroughly mixed with the blood by lifting the bottom of the bag. The taking-set tubing must be held steady to prevent any movement being referred to the needle. It is important that the anticoagulant solution reaches the ports, as this is where clots may form if mixing is not adequate. In addition to lifting the bottom of the bag, it should be squeezed gently from the bottom periodically to ensure adequate mixing. The importance of thoroughly mixing the blood with the anticoagulant solution cannot be overemphasized and must be repeated many times during the donation to eliminate the formation of clots

9. The blood group label must be firmly affixed to the blood bag in the space provided. The corresponding perforated serial number is attached lengthwise to the vacutainer, making certain that the whole label is thoroughly attached

10. When the required amount of blood has been collected (450 grams), clamp off the donor tube by applying forceps close to the entrance of the bag. This must be done BEFORE the needle is removed from the vein (see illustration No. 12 below)

Illustration No. 12

CLAMPING THE DONOR TUBE

This demonstrates forceps being applied to the donor tube and close to the entrance of the bag following collection of 450 grams of blood.

11. The sphygmomanometer pressure is released and the blood bag removed from the scale

12. The nurse removes the needle from the vein, applies a sterile dressing and firm pressure to the venepuncture site

13. The clinic assistant will then apply firm pressure to the site of venepuncture with one hand and take the needle

and attached tubing from the nurse with the other hand – care being taken not to touch the nurse's hand. The donor is asked to apply firm pressure to the site of venepuncture, with the dressing in place

14. The clinic assistant then pushes the needle through the centre of the rubber stopper of the labelled vacutainer, making sure that the serial number on the blood bag corresponds with the one on the vacutainer (see illustration No. 15 page 25)

15. The clinic assistant now takes the blood bag and the vacutainer to the Preparation Table. The forceps MUST NOT be removed from the taking set tubing

16. THE CLINIC ASSISTANT MUST NOW PLACE A STRIP OF SCOTCH TAPE OVER THE BLOOD GROUP LABEL AND BAG TO ENSURE THAT THE LABEL ADHERES FIRMLY

17. To save steps she then picks up a new plastic blood bag, forceps and dry vacutainer from the Preparation Table and proceeds to the next donor.

CLINIC ASSISTANT – 1 – at the Preparation Table.

Duties.

1. Prepare the table (see illustration No. 13 below)

2. Place empty blood bags in the available tray

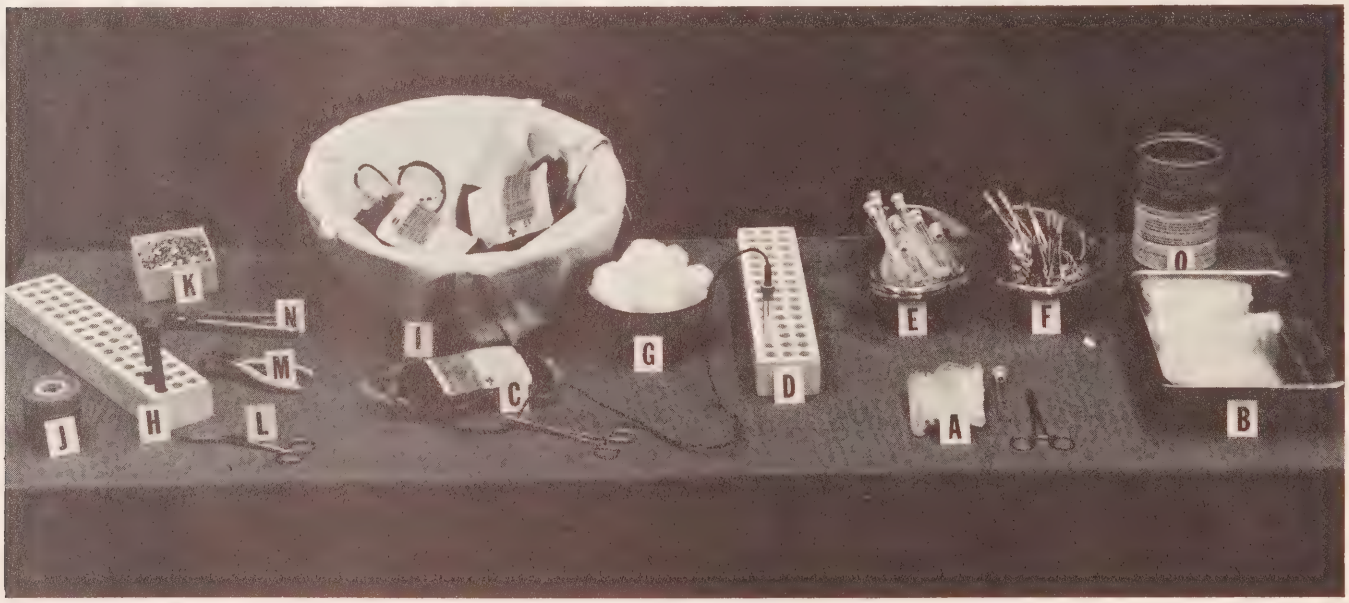
3. Arrange vacutainers and forceps on the table for each pick up

4. Keep table clean and tidy at all times

5. Process each bag of blood as soon as possible after it arrives at the table, in the following manner, in order to prevent clots forming in the tubing:

   a) Check that the label on the vacutainer corresponds with the label on the blood bag. The forceps must not be removed from the tubing until the following procedure has been completed

Illustration No. 13

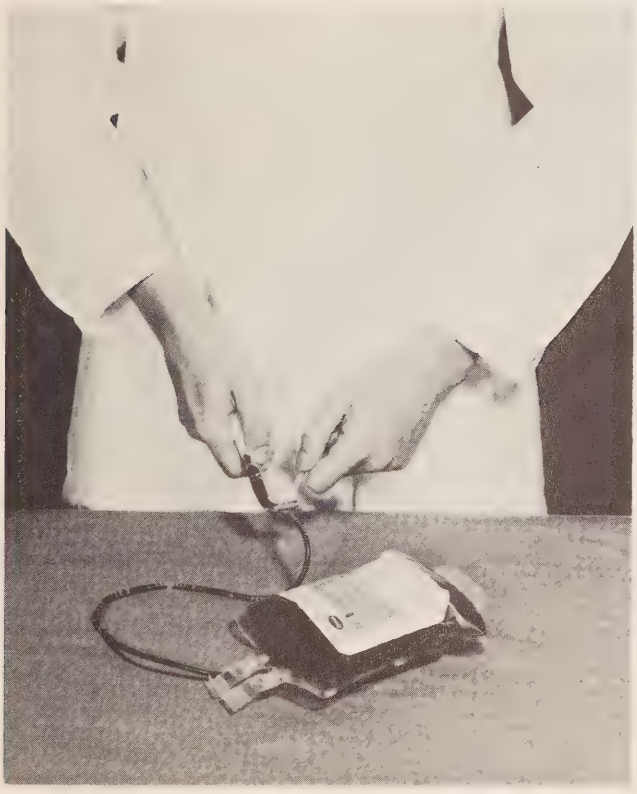


PREPARATION TABLE

A. Complete taking equipment
B. Additional supply of blood bags
C. Blood donation awaiting final preparation
D. Wooden racks for vacutainers
E. Dry vacutainers
F. Forceps
G. Absorbent cotton balls
H. Blood specimens in vacutainers
I. Clean area for completed blood donations
J. Clear adhesive tape (obtained locally) for sealing label to plasticized blood bag
K. Clips for sealing the donor tube into segments
L. Bandage scissors
M. Instrument for stripping blood from donor tubing
N. Instrument for applying clips
O. Waste tin

b) Insert the needle in the vacutainer tube and strip the blood from the distal sections of the tubing until it is approximately half-filled to obtain sufficient blood for the laboratory specimen (see illustration No. 15 page 25)

Illustration No. 14



STRIPPING THE BLOOD FROM THE TUBING TO THE BAG

This demonstrates stripping the blood in the tubing back into the bag to ensure good mixing of the blood donation.

c) Using the hand-sealer and a clip, clamp the tubing at the first X mark from the needle. (see illustration No. 16 page 26) Cut the tubing off at this seal. The needle is then removed from the vacutainer and discarded in an empty container. Place the vacutainer in the Kahn rack so that the serial numbers follow consecutively, starting at the top left hand corner.

d) Place the blood bag flat on the table. Now remove the forceps, allowing the tubing to fill with citrated blood from the bag

e) Strip the blood in the tubing back into the bag. (see illustration No. 14 above). Holding the stripper firmly in place at the entrance to the bag, invert the bag several times to mix the blood; now remove the stripper, allowing the tubing to refill with blood from the bag

Illustration No. 15

INSERTION OF THE NEEDLE INTO THE VACUTAINER

Following withdrawal of the needle from the vein it is inserted in the vacutainer to obtain the necessary blood specimen.

f) Starting at the distal end of the tubing and working toward the bag, create five segments of blood-filled tubing by double hand-sealing the tubing with two clips at every second X mark. These segments are required for cross-matching. The number on the segment should always be complete (see illustration No. 17 page 26)

g) Fold the segmented tubing by starting at the distal end of the tubing and then insert through the slits on the side of the bag. Place the completed donation in the blood bag carton. (see illustration No. 18 page 26)

h) Invert the bag several times to ensure thorough mixing of the blood before placing in a blood bag carton. The units of blood must be taken to refrigeration at regular intervals by the Transport Driver.

Illustration No. 16

HAND-SEALING THE DONOR TUBING

This demonstrates the donor tubing being hand-sealed close to the vacutainer.

Illustration No. 17

DOUBLE HAND-SEALING OF THE DONOR TUBING

This illustrates the double hand-sealing of the donor tubing into five segments required for cross-matching.

Under disaster conditions, extra volunteers may be required to operate hand-sealers and clips. In such instances, the clinic assistant at the Preparation Table must be responsible for obtaining the laboratory specimen, making the first seal, cutting off the needle, stripping the tubing to allow re-filling with citrated blood and double hand-sealing the five segments. The operators of the additional hand-sealers can help with the double hand-sealing only, and the careful placement of the blood bags into the blood bag carton. (see illustration No. 18 below)

Illustration No. 18

PACKING THE BLOOD BAGS IN THE BLOOD BAG CARTON

This demonstrates the care with which the blood bags must be packed in the blood bag carton.

If there is a delay from the time of stripping until the segments are made, the blood in the tubing will have started to separate. The blood must then be stripped into the bag a second time, mixed, and the tubing re-filled before the segments are made.

CLINIC ASSISTANT – 1 (scrub aide).

Duties.

1. Set up sterile table in advance of clinic

2. Sterilize donors' arms prior to venepuncture by the nurse

3. Replenish sterile supplies on table as required.

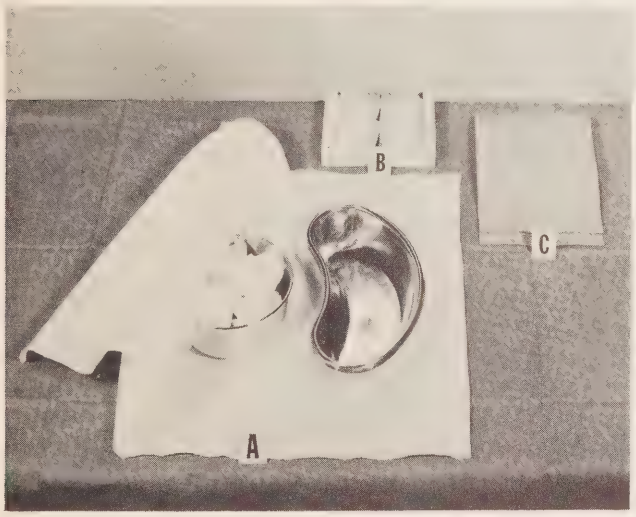
Rest Room

VOLUNTEERS – 2

Duties

1. Under direction of the team nurse to care for donors immediately following the donation period. (see illustration No. 19, "Rest Area Table", below)

Illustration No. 19



REST AREA TABLE

A. Sterile dressings for pressure and cleansing.
B. Elastoplast dressing.
C. Disposal bag.

2. Receive donor from Donor Room clinic assistant and conduct to rest bed
3. Instruct donor in technique of pressure over puncture-site and see that it is maintained
4. After five minutes, inspect puncture-site and apply adhesive dressing
5. Watch for signs of fainting or other reaction. If donor loses consciousness, notify supervisor of Donor Room or physician.
6. After ten minute rest period, direct donor the Canteen.

Canteen

VOLUNTEERS – 2.

Duties.

1. Provide a hot drink to each donor prior to his leaving the clinic
2. Request donors not to smoke for at least one hour after giving blood.

Clinic Dispatching Area

TRANSPORT DRIVERS – 3.

Duties.

1. Pick up prepared blood bags in their carton as well as the wooden Kahn racks containing the corresponding vacutainers (specimen tubes) from the Donor Room. The carton from which the six tins of empty blood bags have been removed will serve as a good carrier for three wooden Kahn racks each containing 45 vacutainers
2. Arrange shipment to the Shadow Depot (see Annex 4, Item (c) Blood Bag Carton)
3. Store blood in refrigerated van awaiting dispatch to Shadow Depot
4. Corresponding registration sheets must accompany all shipments of blood to the Shadow Depot.

TEAM ROUTINE TO OBTAIN GROUP SPECIFIC BLOOD – PHASE II

Personnel Assignment and Duties:

Reception Area

VOLUNTEER RECEPTIONIST – 1.

Duties.

1. Maintain order at entrance
2. Direct donors to technician.

TECHNICIAN – 1.

Duties.

1. Perform haemoglobin test and ask routine questions on jaundice, etc., (page 21)
2. Perform blood grouping test on those without donor cards (page 21)
3. If the haemoglobin test is satisfactory, issue appropriate blood group label and direct donor to clerk-typist for registration
4. If the haemoglobin test is unsatisfactory (less than 12.5 grams), thank the person for reporting and explain that blood cannot be taken at this time.

CLERK- TYPIST – 1.

Duties.

1. Record under the appropriate heading on the "Donor Registration Sheet" the details concerning each donor, serial number of blood label, blood group, Rh-type if known, donor's name and address

2. Obtain and record answers to the medical history questions (see page 21)

3. If there is any contra-indications to taking blood, thank the person for reporting and explain that blood cannot be taken at this time

4. If the answer to (b), (c), and (d) is "no", direct the accepted donor to the waiting room.

DUTIES OF PERSONNEL IN OTHER AREAS:

Donor Room	– as in Phase 1	(see page 22)
Rest Room	– as in Phase 1	(see page 27)
Clinic Dispatching Area	– as in Phase 1	(see page 27)

STANDARD TECHNICAL METHODS

INTRODUCTION

The standard technical methods to be used at the blood collecting clinic and Blood Shadow Depot are outlined in this chapter. Rh determinations will be carried out at the Blood Shadow Depot when time permits.

HAEMPGLOBIN DETERMINATION BY THE COPPER SULPHATE METHOD

1. Cleanse donor's finger with alcohol swab. Wipe finger dry with swab. (The left ring (4th) digit is preferred.)
2. Make a stab incision into the ball of the finger with a sterile lancet. Apply pressure around finger from base toward nail, milking out a large drop. Wipe off first drop with dry swab
3. Milk second drop of blood out of finger; then, holding capillary tube horizontal, with free tip in drop of blood, allow blood to fill at least three-quarters of tube. Keep tip of tube in blood to prevent air from entering
4. Place index finger over hole in bulb top, and while holding capillary tube at 45° angle, deliver one drop of blood into copper sulphate solution from a height of one inch above the surface. Drop must not touch sides of copper sulphate container
5. Acceptable level of haemoglobin (more than 12.5 grams per 100 ml. of blood) is indicated by slow sinking of the drop of blood to the bottom of the vial
6. Unacceptable level of haemoglobin (less than 12.5 grams per 100 ml. of blood) is indicated by the drop floating, or after sinking a short distance, then rising to the surface or rising part way to the surface and then slowly sinking
7. Approximately one minute should elapse between tests to allow the solution to clear itself. Use new capillary tube for each person; bulbs may be used repeatedly unless blood has been sucked into bulb, in which case discard and use new bulb. One vial of copper sulphate may be used for 25 tests.

DETERMINATION OF BLOOD GROUP BY TILE METHOD

This test at the clinic is for screening purposes. A second confirmatory blood group test and also Rh determination will be carried out when the blood is returned to the Blood Shadow Depot.

1. From incision in finger made for haemoglobin test express more blood and place two separate drops on the tile side by side
2. To the left drop of blood add one drop of anti-A grouping serum and to the drop on the right add one drop of anti-B grouping serum
3. With a separate cork, applicator stick, soda straw or match stick, thoroughly stir each mixture in a circular fashion to a circle about the size of a five cent coin
4. Rock the tile gently back and forth. Positive reactions should appear in less than 60 seconds. (Care must be taken to read results before the mixture dries.)

INTERPRETATION OF REACTIONS

1. Agglutination (clumping of the red cells) with the unknown blood and anti-A serum, and no reaction (serum-blood mixture remains smooth or evenly suspended) with anti-B serum denotes the blood is Group A. (see illustration No. 20 below)

Illustration No. 20

REACTION OF UNKNOWN WHOLE BLOOD WITH KNOWN TEST SERA

UNKNOWN BLOOD	REACTION WITH ANTI-A SERUM	REACTION WITH ANTI-B SERUM	GROUP
RED CELLS	⊙ +	● −	A
RED CELLS	● −	⊙ +	B
RED CELLS	● −	● −	O
RED CELLS	⊙ +	⊙ +	AB

Key	Agglutination ⊙ +	Agglutination ● −

⊙ Indicates clumped Red Cells ● Indicates free Red Cells

2. Agglutination or clumping with anti-B serum and not with anti-A serum denotes the blood is Group B.
3. No agglutination or clumping with either anti-A or anti-B serum denotes the blood is Group O.

4. Agglutination or clumping with both anti-A and anti-B serum denotes the blood is Group AB.

RH-TYPE. SLIDE TEST WITH ANTI-D (Carried Out at Blood Shadow Depot)

A heavy suspension of cells (50%) is needed in their own plasma or serum. Oxalated blood may be used undiluted. An Rh-typing box is required: the illuminated plastic slide is heated by a fluorescent lamp underneath to provide a warm surface with a temperature of between 40° C and 45° C.

Label a glass slide with the name of the donor or patient and place two drops of the cell suspension or blood to be tested on it. Add to these drops one drop of anti-serum labelled "Anti-D for Slide Test". Mix the drops well with the aid of an applicator over an area about half the size of the slide. Without any delay, put the slide on the viewing box and rock the box gently to and fro. NOTE THE TIME.

Rh (D) positive blood will show agglutination in between 15 and 30 seconds; this agglutination with coarse, and large clumps will become visible in the next 60 seconds.

Rh (D) negative blood will not show agglutination if the final reading of the test is made at one minute from the time the slide was placed on the box. Readings after this time are prone to give false results.

SUPPLIES AND EQUIPMENT

INTRODUCTION

The Federal Emergency Health Services have purchased the supplies and equipment for 28 Blood Shadow Depots for use across Canada; an additional two units are available for training purposes. These Depots will be activated immediately following a wartime disaster and have the capability of collecting, processing and distributing 300,000 units of whole blood.

The supply activities of these Depots will be under the supervision of Health Supplies Officers (Pharmacists) who will assume these responsibilities, both in peacetime and wartime.

SUPPLIES FOR SHADOW DEPOT HEADQUARTERS

The supplies to be used by Headquarters staff are shown as List 1 Annex 1. They will be functionally packed in a set of boxes marked with a black circle along with the bulk items that will be properly labelled. The Health Supplies Officers will see that these supplies are distributed to the proper areas of the headquarters of the Shadow Depot.

SUPPLIES FOR COLLECTION UNITS

The supplies required to set up a Collection Unit are shown as list 2 Annex 1. These will be packed in a set of boxes marked with a green circle along with the bulk items which will be properly labelled.

SUPPLIES FOR COLLECTING TEAMS

When a collecting team is leaving the Shadow Depot, the senior person in charge will be issued with a packed box (marked with a red circle) and certain bulk items in vendors cartons; the team also requires certain sterile items, sera etc. The complete list is shown as list 3, Annex 1. These supplies are the expendable items required to service the Collection Unit for one 8 hour shift.

HEALTH SUPPLY PERSONNEL

The Director, Emergency Health Services in a province, on the advice of the Provincial Director of Emergency Blood Services is responsible for appointing the basic team for each Shadow Depot. A Health Supplies Officer (Pharmacist) will be named to the basic team by the Director of Emergency Health Services in consultation with the Director of the Shadow Depot. The second pharmacist will be nominated later by the Director of the depot in co-operation with the Health Supplies Officer (HSO).

DUTIES AND/OR FUNCTIONS OF HEALTH SUPPLIES OFFICERS

Pre-disaster

1. To maintain the supplies and equipment in operational readiness at all times
2. To maintain the storage area at the pre-positioned site in accordance with requirements specified by Federal EHS (see Annex 7)
3. To assist the Director in locating an acceptable operational site and to see that plans are made for its use
4. To rotate all dated items as and when required
5. To make arrangements through Municipal Emergency Government Headquarters for all items required from local resources
6. To obtain and/or arrange for any staff required to assist him with his functions; to assist with the administration of the units if required
7. To make an operational plan for the movement of the Shadow Depot from storage site to the operational site. The plan should include instructions on how his staff will report and function. (see Technical Guide for Health Supplies Officers – Blood Shadow Depot)

There are several important factors that must be considered when arrangements are being made for distribution. The senior Pharmacist should;

1. Arrange with the Municipal Health Supplies Officer for the number of vehicles required to move and service the unit
2. Arrange with the Municipal Health Supplies Officer for the establishment of a source of supply for all items to be obtained from local resources, e.g.

propane gas, cleaning supplies, ice, cellulose tape and gasoline and oil for vehicles.

Post-disaster

1. When alerted he will put his operational plan in motion as follows:

   (a) Proceed to the site of operation and make arrangements to receive the supplies and equipment for the Shadow Depot

   (b) Arrange for the alternate pharmacist to proceed to the site of storage, load the vehicles and despatch them to the operational site

   (c) Have the alternate pharmacist (HSO) obtain the known additional items required from local resources before reporting to the Shadow Depot

   (d) Advise the remainder of his staff to report to the operational site.

2. When the units arrive at the operational site he will take the following action:

   (a) Direct unloading and distributing the boxes and bulk supplies to functional areas in accordance with the colour coding and with the aid of the Alphabetical Listing and Distribution Chart (see Annex 2, page 43)

   (b) Assign personnel to segregate the supplies for the three collection units in accordance with the check list Annex 3, Parts 1 and 2, page 37.

   (c) Ensure that all the equipment required to assemble and operate the autoclave is sent to the preparation area. The supplies are as follows:

7-599	Sterilizing Equipment, Field, Portable, Complete:	Set 1
6-2128	Cylinder, 40 lb. Capacity, Propane Gas: (filled)	Each 2
6-2128/8	Cylinder Propane, Copper Tubing 1/2 inch O.D. 25 foot coil with fittings:	Coil 1
6-2128/11	Cylinder Propane, Control Assembly For:	Each 1

   (d) Arrange for the release to the preparation area of all supplies required for sterilization. The supplies are as follows:

Basin and Tray Packet	Each 3	(from 8-9725 B.S.D. Collection Unit Box No. 1)
Combined Linen Packet	Each 3	(from 8-9726 B.S.D. Collection Unit Box No. 2)
Instrument Packet	Each 3	(from 8-9726 B.S.D. Collection Unit Box No. 2)
Scrub Packet	Each 3	(from 8-9726 B.S.D. Collection Unit Box No. 2)

5-692	Towel Transfusion, Absorbent, Non-Sterile, Folded 6 3/4" by 6 3/4" (from Supplies Area)	Each 10,800

   (e) Make sure that the polyethylene sheeting for issue to the collecting teams has been cut in 6 ft. lengths

   (f) Ensure that the shipping room has all the component parts of the blood shipping container so that they can be assembled. Alert the shipping area to cut two lengths of gum tape 24" long to be included in each blood shipping container and ascertain that they have sufficient cracked ice on hand

   (g) Arrange for the release of the 23 day back-up supply unit from storage and receive into the supplies area

   (h) Arrange for the ordering of all supplies from Municipal Emergency Government Headquarters

   (i) Alternate his duties with the second pharmacist on a twelve hour shift basis.

NOTE: ALL PERSONNEL OF A SHADOW DEPOT SHOULD READ AND BECOME FAMILIAR WITH THE DIRECTIVE ON THE EMERGENCY HEALTH SERVICES BLOOD SHIPPING CONTAINER (SEE ANNEX 4).

Annex 1

SUPPLY LIST NO. 1

Blood Shadow Depot

Headquarters

Cat. No.	NOMENCLATURE	QUANTITY	
1-231/4	Benzalkonium Chloride Solu. 16%, 4 oz.:	Btl.	1
1-380	Detergent, Powder, 5 lb.:	Tin	1
1-1082	Soap, Hexachlorophene, 4 oz.:	Cake	4
1A-164	Bottle, One (1) Gallon, With Cap and Direction Label:	Each	4
1A-561/1	Label, Blood Bag, Group AB, Bilingual:	Each	300
1A-561/2	Label, Blood Bag, Group A, Bilingual:	Each	900
1A-561/3	Label, Blood Bag, Group B, Bilingual:	Each	300
1A-561/4	Label, Blood Bag, Group O, Bilingual:	Each	1,500
1A-561/6	Label, Blood Bag, RH Negative, Bilingual:	Each	600
2-195	Sodium Chloride Tablet, 40 gr.:	Each	200
3-575	Dressing, Elastic, Adhesive Strip, 3 inch by 1 inch:	Each	24
3-660	Gauze, Plain, 100 yards:	Pkg.	1
4-151	Sheeting, Polyvinyl Film, Opaque, Gauge 0.004, 36 inch Wide by 25 yard Roll:	Roll	3
5-20	Applicator, Wooden, 6 inch, 72 doz.:	Box	9
5-161	Brush, Scrub, Nail:	Each	12
5-176	Can, Garbage, Steel, 10 Gallon: (With Lid)	Each	6
5-610	Tag, Perforated, For Sterile and Non-Sterile Goods, Set of Four (4), 1,000 tags per box:	Box	1
5-691	Towel, Hand, Paper, Package of 150:	Pkg.	25
5-692	Towel, Transfusion, Absorbent, Non-Sterile, Folded, 6¾ inch by 6¾ inch:	Each	525
5-695	Towel, Dish, Cotton, 22 inch by 34 inch:	Each	6
6-437/1	Blood and Intravenous Solution Giving Set, Sterile and Disposable, E.H.S. Approved:	Each	11,040
6-438/1	Blood Collecting-Dispensing Bag and Donor Set, With Anticoagulant, 450 cc:	Each	24
6-2128	Cylinder, Empty, 40 lb. Capacity, Propane Gas:	Each	2
6-2128/1	Gas, Propane:	lb.	80
6-2128/8	Cylinder, Propane, Copper Tubing ½ inch O.D. 25 foot Coil With Fittings:	Coil	1
6-2128/11	Cylinder Propane, Control Assembly For:	Each	1
6-5870	Scissor's, Bandage, 5½ inch, Lister's:	Each	1
7-465	Table, Utility, All Metal, Folding Type, 5 feet:	Each	6
7-507	Control, Sterilization, Indicating Paper:	Book	2
7-599	Sterilizing Equipment, Field, Portable, Complete:	Set	1
7-600/1	Sterilizer Autoclave Field Model Portable, Basic Repair and Maintenance Unit No. 1 For:	Set	1
7-600/2	Sterilizer Autoclave Field Model Portable, Set of Spares for Propane, Natural and Mixed Gas, No. 1:	Set	1
7-600/3	Sterilizer Autoclave Field Model Portable, Set of Spares for Electric Power, No. 1:	Set	1
7-600/4	Sterilizer Autoclave Field Model Portable, Set of Spares for Direct Steam, No. 1:	Set	1
7-600/9	Sterilizer Autoclave Field Model Portable, Set of Tools For:	Set	1
8-820/1	Form, Blood Bank, Work Sheet (Bilingual):	Each	600
8-820/2	Form, Blood Bank Record: (Bilingual):	Each	25
11-620	Beaker, Griffin, Low Form, Heat Resistant Glass, 250 ml:	Each	12
11-1325	Box, Rh Typing:	Each	4
11-1325/1	Box Rh Typing, Blood Typing Slide 6 inch by 3 inch:	Each	16
11-1850	Centrifuge, Bench Type, With 4 Place Head For 20 Serum Tubes:	Each	1
11-5450	Pencil, Wax, Non-Running, Red:	Each	3
11-5517	Pipette, Disposable, Pasteur's, 7mm by 6 inch:	Each	72
11-5517/1	Pipette Disposable, Bulb 1cc Rubber:	Each	72
11-5775	Plate, Glass, Opaque, White Carrara, Polished Edges, 7½ inch by 4 inch by 11/32 inch Thick:	Each	24
11-5840	Refrigerator, Electric, Domestic Type, 14 cu. feet:	Each	1
11-6964/1	Tube, Blood Collecting, Vacutainer, Plain, 7cc, 50s:	Tin	5
11B-4101	Serum, Blood Grouping, Anti A:	Vial	126
11B-4102	Serum, Blood Grouping, Anti AB (Group O):	Vial	126
11B-4103	Serum, Blood Grouping, Anti B:	Vial	126
11B-4104	Serum, Blood Typing, Anti Rho (Anti D):	Vial	126
13-494	Bag, Polyethylene, Transparent, .002 inch, Size 28 inch by 12 inch by 6 inch Gusset:	Each	1,900
13-496	Bag Polyethylene, Metal Closure For:	Each	950
13-501	Brace, Bit, 10 inch:	Each	4
13-502	Bit, Screwdriver, For Slotted Head Screws, ¼ inch:	Each	8
13-503	Container, Blood Shipping, Complete:	Each	920
13-510	Hammer, Claw, 1 lb.:	Each	1
13-515	Opener, Carton, With Five (5) Extra Reversible Blades:	Each	1
13-515/1	Opener Carton, Blade For:	Pkg.	6
13-517	Pad, Insulation, Paper Backed, 60 inch by 13-3/8 inch by 1 inch:	Each	936

Cat. No.	NOMENCLATURE	QUANTITY	
13-518	Pad, Insulation, Paper Backed, 16 inch by 14 inch by 1 inch:	Each	1,872
13-535	Rubber Stamp, Dating Style:	Each	1
13-535/1	Rubber Stamp, Dating Style, Inking Pad Black 4¼ inch by 2¾ inch:	Each	1
13-535/2	Rubber Stamp, Dating Style, Ink Black:	Btl.	1
13-540	Saw, Hand, 26 inch, Cross-Cut, 8 point:	Each	1
13-575	Tape, Gummed Paper, 3 inch:	Each	30
13-575/1	Tape, Gummed Paper, 3 inch, Dispenser For:	Each	1
13-610	Twine, Cotton, Plain, 7 ply, 2½ lb.:	Cone	3

SUPPLY LIST NO. 2

Blood Shadow Depot

Collection Unit

Cat. No.	NOMENCLATURE	QUANTITY	
1-231/4	Benzalkonium Chloride Solution, 16%, 4 oz.:	Btl.	1
1-1082	Soap, Hexachlorophene, 4 oz.:	Cake	4
1A-164	Bottle, 1 Gal., With Cap and Direction Label:	Each	4
1A-561/1	Label, Blood Bag, Group AB, Bilingual:	Each	500
1A-561/2	Label, Blood Bag, Group A, Bilingual:	Each	1,000
1A-561/3	Label, Blood Bag, Group B, Bilingual:	Each	500
1A-561/4	Label, Blood Bag, Group O, Bilingual:	Each	2,000
1A-1000	Vial, Glass, Flat Bottom, 15/16 inch O.D. by 3-11/16 inch long:	Each	8
2-600/1	Nikethamide Ampoule, 25%, 5 cc:	Each	6
5-51	Basin, Dressing, Kidney-Shaped, Corrosion-Resisting Steel, 10 inch	Each	12
5-79	Basin, Round, Corrosion-Resisting Steel, 6 inch by 2½ inch:	Each	18
5-101	Basin, Round, Corrosion-Resisting Steel, 14½ inch Diameter by 4¾ inch Deep:	Each	9
5-161	Brush, Scrub, Nail:	Each	12
5-176	Can, Garbage, Steel, 10 gallon: (With Lid)	Each	6
5-252	Gown, Operating, Surgical, Cotton, Green, Size 36:	Each	12
5-438/2	Pail, Combinet, White Enamel, 9½ quart, With Cover:	Each	2
5-454	Pillow, Bed, Feather, Hospital Type:	Each	16
5-454/1	Pillow, Bed, Polyethylene Bag For:	Each	16
5-502	Sheet, Bed, Cotton, Green, 80 inch by 90 inch:	Each	3
5-503	Sheet, Dressing, Cotton, Green, 36 inch by 36 inch:	Each	18
5-507	Stick, Orangewood, 5 inch:	Each	12
5-691	Towel, Hand, Paper, Package of 150:	Pkg.	25
5-695	Towel, Dish, Cotton, 22 inch by 34 in.:	Each	9
5-696	Towel, Operating Room, Huck, Green, 20 inch by 40 inch:	Each	30
5-761	Tray, Corrosion-Resisting Steel, Without Cover, 12¼ inch by 7¾ inch by 2¼ inch:	Each	6
5-850	Wrapper, Sterilization, 18 inch by 18 inch, Cotton:	Each	6
5-852	Wrapper, Sterilization, 36 inch by 36 inch, Cotton:	Each	6
6-438/2	Blood Collecting-Dispensing Bag and Donor Set, Hand Sealing Instrument For:	Each	6
6-438/4	Blood Collecting-Dispensing Bag and Donor Set, Hook For:	Each	36
6-438/5	Blood Collecting-Dispensing Bag and Donor Set, Scale Collecting For:	Each	12
6-438/7	Blood Collecting-Dispensing Bag and Donor Set, Tube Stripper For:	Each	12
6-2810	Forceps, Haemostatic, Crile's, 5½ inch, Straight:	Each	12
6-3100	Forceps, Sponge Holding, Regular, 9 inch, Straight:	Each	9
6-3310	Forceps, Towel, Backhaus, 5¼ – 5½ inch:	Each	27
6-5870	Scissor's, Bandage, 5½ inch, Lister's:	Each	1
6-6480	Sphygmomanometer, Aneroid:	Each	12
6-6984	Syringe, Hypodermic, Single Use, Sterile, 5 cc, With Needle, Gauge 20 by 1½ inch:	Each	30
7-5	Bed, Hospital, Canvas Deck, 30 inch by 76 inch by 27 inch High, Solid Frame, Folding Legs:	Each	16
7-360/2	Table Instrument Mayo's, Tray Corrosion-Resisting Steel For:	Each	3
7-465	Table, Utility, All Metal, Folding Type, 5 Feet:	Each	6
8-430	Blanket, Grey, G.S.:	Each	20
8-820	Form, Donor Registration Sheet: (Bilingual)	Each	100
11-1326	Box, Technician, Metal:	Each	1
11-1472	Bulb, Rubber, Capillary Pipette Filling:	Each	500
11-3630	Grip, Hand, Round, Wooden, 1 inch Diameter by 4 inch long:	Each	10
11-5450	Pencil, Wax, Non-Running, Red:	Each	3
11-5517	Pipette, Disposable, Pasteur's, 7mm by 6 inch:	Each	4
11-5517/1	Pipette Disposable, Bulb 1 cc Rubber:	Each	4
11-5775	Plate, Glass, Opaque, White Carrara, Polished Edges, 7½ inch by 4 inch by 11/32 inch Thick:	Each	6
11-6791	Support, Wooden, For Copper Sulphate Test:	Each	3

Cat. No.	NOMENCLATURE	QUANTITY	
11B-953	Copper Sulphate Solution, Sp Gr 1.053, 220 cc:	Each	4
13-515	Opener, Carton, With Five (5) Extra Reversible Blades:	Each	1
13-535	Rubber Stamp, Dating Style:	Each	1
13-535/1	Rubber Stamp Dating Style, Inking Pad Black 4¼ inch by 2¾ inch:	Each	1
13-535/2	Rubber Stamp Dating Style, Ink Black:	Btl.	1

SUPPLY LIST NO. 3

Blood Shadow Depot Collecting Team

Cat. No.	NOMENCLATURE	QUANTITY	
1A-6	Bag, Paper, 10 lb.:	Each	100
3-105	Bandage, Cotton, 2 inch by 5 yards:	Each	6
3-490	Cotton, Absorbent, Regular, 1 lb:	Pkg.	1
3-575	Dressing, Elastic, Adhesive Strip, 3 inch by 1 inch:	Each	408
3-818/1	Sponge, Surgical Gauge, 2 inch by 2 inch, 12 ply, envelope of 10 Sterile Sponges:	Env.	200
5-20	Applicator, Wooden, 6 inch, 72 dozen:	Box	1
5-188	Cup, Drinking, Paper, Flat Bottom, 8 oz.:	Each	600
5-692	Towel, Transfusion, Absorbent, Non-Sterile, Folded, 6¾ inch by 6¾ inch:	Each	425
6-438/1	Blood Collecting-Dispensing Bag and Donor Set, With Anticoagulant, 450 cc:	Each	408
6-438/3	Blood Collecting-Dispensing Bag and Donor Set, Clip For:	Each	5,000
11-4275	Lancet, Sterile, Blood Letting, Disposable Type:	Each	600
11-5515	Pipette, Capillary, 0.8mm by 56mm:	Each	600
11-6773	Support, Test Tube, Wooden, Forty-Five Test Tube Capacity:	Each	12
11-6964/1	Tube, Blood Collecting, Vacutainer, 7 cc, 50s:	Tin	8
11B-4101	Serum, Blood Grouping, Anti A:	Vial	9
11B-4102	Serum, Blood Grouping, Anti AB (Group O):	Vial	9
11B-4103	Serum, Blood Grouping, Anti B:	Vial	9
13-503/3	Container, Blood Shipping, Blood Bag Carton For:	Each	34

ALPHABETICAL LISTING AND DISTRIBUTION CHART OF SUPPLIES WITHIN BLOOD SHADOW DEPOT

1. Top of square indicates case or box number within the area. 2. Bottom of square indicates quantity of the item in the area.

3. "B" Indicates a bulk item.

NOMENCLATURE		CATALOGUE NO.	LABORATORY AREA	PREPARATION AREA	SHIPPING AREA	SUPPLIES AREA	COLLECTION UNIT (3)	COLLECTING TEAM (27)					TOTAL QUANTITY
Applicator, Wooden, 6 inch													
72 dozen:	Box	5-20	1 9					1 27					36
Bag, Paper, 10 lb.:	Each	1A-6						1 2700					2,700
Bag, Polyethylene, Metal Closure													
For:	Each	13-496			1 950								950
Bag, Polyethylene, Transparent, .002													
inch, Size 28 inch by 12 inch With 6													
inch Gusset:	Each	13-494			1 1900								1,900
Bandage, Cotton, 2 inch by 5 yards:	Each	3-105						1 162					162
Basin, Dressing, Kidney-Shaped, C.R.S.,													
10 inch:	Each	5-51					1 36						36
Basin, Round, C.R.S., 6 inch by													
2 ½ inch:	Each	5-79					1 45						
		5-79					2 9						54

Annex 3

Part 1

CHECK LIST FOR A COLLECTION UNIT

BLOOD SHADOW DEPOT

The Health Supplies Officer will issue to each Collection Unit the following:

1. 8-9727	B.S.D. Collection Unit Box No. 3	Each	1
2. 5-176	Can, Garbage, Steel, 10 Gallon, With Lid:	Each	6
3. 5-454	Pillow, Bed, Feather, Hospital Type: (5-454/1 Pillow, Bed, Feather, Polyethylene Bag For issued with pillow)	Each	16
4. 5-691	Towel, Hand, Paper, Package of 150:	Pkg.	25
5. 7-5	Bed, Hospital, Canvas Deck, 30" x 76" x 27", Solid Frame, Folding Legs:	Each	16
6. 8-430	Blanket, Grey, G.S.:	Each	20
7. 7-465	Table, Utility:	Each	6

Part 2

CHECK LIST FOR A COLLECTING TEAM

BLOOD SHADOW DEPOT

The Health Supplies Officer will issue to each Collecting Team the following:

1. 8-9720	B.S.D. Collecting Team Box No. 1:	Each	1
2. The following sterile equipment:			
	(a) 5-692 Towels Transfusion	Each	425
	(b) Basin and Tray Packet	Each	1
	(c) Combined Linen Packet	Each	1
	(d) Instrument Packet	Each	1
	(e) Scrub Packet	Each	1
3. 6-438/1	Blood Collecting-Dispensing Bag and Donor Set, With Anticoagulant, 450cc: (8 cartons and 24 bags)	Each	408
4. 11-6964/1	Tube, Blood Collecting, Vacutainer, 7 cc: (from the 5 tins in 8-9760 B.S.D. Supplies Box No. 1)	Each	8
5. Six foot lengths sheeting polyvinyl		Each	3
6. 11B-4101	Serum, Blood Grouping, Anti-A (1 box):	Vial	9
11B-4102	Serum, Blood Grouping, Anti-AB (1 box):	Vial	9
11B-4103	Serum, Blood Grouping, Anti-B (1 box):	Vial	9
7. 13-503/3	Container, Blood Shipping, Blood Bag Carton For: (1 box)	Each	34
8. 18 inch lengths gummed paper tape		Each	34

Annex 4

BLOOD SHIPPING CONTAINER

INTRODUCTION

Distribution of fresh whole blood at the time of a national disaster will be a tremendous undertaking.

Emergency Health Services have developed a shipping container for 12 blood bags. This blood shipping container is inexpensive, light and can be handled by one person.

The outside shipping container and component parts will be knocked down flat, and packed in suitable master shipping containers. Gummed paper tape is supplied for assembling the blood bag containers at Shadow Depots.

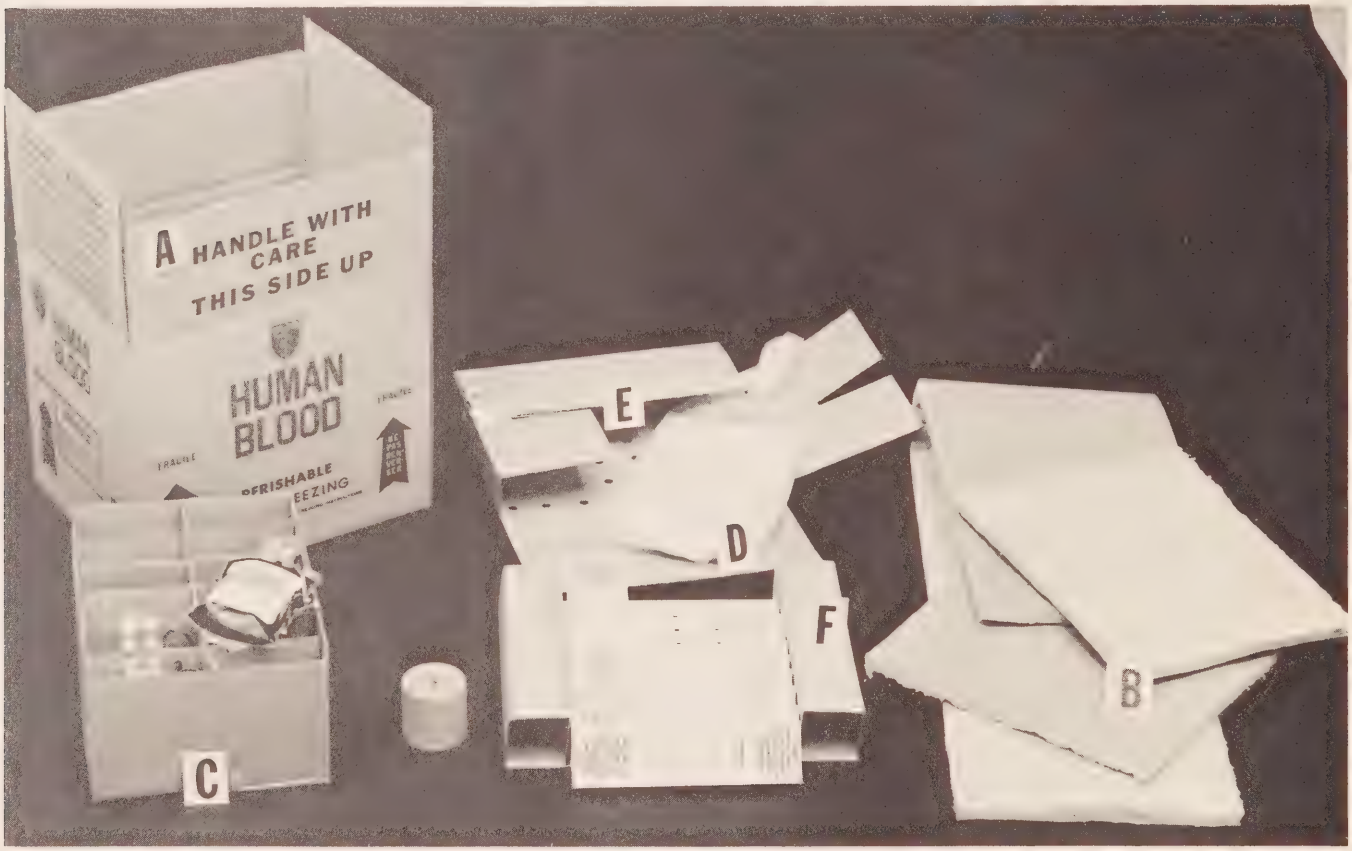
This blood shipping container will be used to transport whole blood, under proper storage conditions, from the Shadow Depots to the medical units.

DESCRIPTION See illustrations No. 21 to No. 25 (p. 38-41).

1. Outside Shipping Container:

This is a corrugated fibreboard carton, size 17 ¼ " x 13 ¼ " x 15 1/4 "for shipping and storing 12 disposable plastic bags of whole blood in refrigerated condition. (See assembly instructions page 40).

Illustration No. 21



BLOOD SHIPPING CONTAINER

A. Outside shipping container
B. Insulating pads with Kraft paper backing: 2 rectangular and 1 long
C. Blood Bag Container
D. Ice Container — 2 polyethylene bags and 1 metal closure
E. Perforated ice tray — slotted
F. Giving set tray

NOTE: Giving sets and gummed tape will be obtained from Bulk Stores of Emergency Blood Services Shadow Depot.

2. Insulating Material

Three sheets of cellulose wadding (1 ½ lb density) are provided, one sheet size 13 3/8" x 60" and two sheets, size 16" x 14". These sheets form an insulating wall around the inside of the outer shipping container. They are paper backed on one side only which allows the blood bag carton to slip into place easily.

3. Blood Bag Carton

This is an open top corrugated fibreboard carton with cells to hold 12 filled blood bags. It may be used as a tray when the blood is being collected.

These blood bag cartons will be used to store the whole blood during refrigeration and will form a component part of the blood shipping container when it has been assembled.

Illustration No. 22

BLOOD SHIPPING CONTAINER INSERTING THE BLOOD BAG CARTON ASSEMBLY ILLUSTRATIONS

Completion of assembly stages 1, 2 and 3 as outlined on page 40 bringing together the shipping container, insulating pads and blood bag box with chopped ice.

A shipping container of 34 knocked-down, flat cartons will be supplied to each Collecting Team and sufficient gummed paper tape to seal the bottom flaps.

Illustration No. 23

BLOOD SHIPPING CONTAINER
Packing the ice-tray

Completion of stage 4 which is the insertion of pre-packed ice tray as outlined on page 40.

4. Ice Container

This consists of two bags 28" x 12" wide with a 6" gusset, made from polyethylene. The bags are placed one inside the other, to prevent leakage. When the bags have been filled with ice, they must be closed with the metal closure provided.

5. Perforated Ice Tray

This tray is perforated with four holes over each plastic bag to allow the cold air from the ice to circulate over the bags of blood below it. It will be prepared in accordance with instructions printed on the flap of the outside container. These instructions also appear on page 40 of this manual.

6. Giving Set Tray

This is a length of cardboard that has been scored so that it can be folded to form a tray to hold 12 giving sets and helps to hold the insulating pads in place.

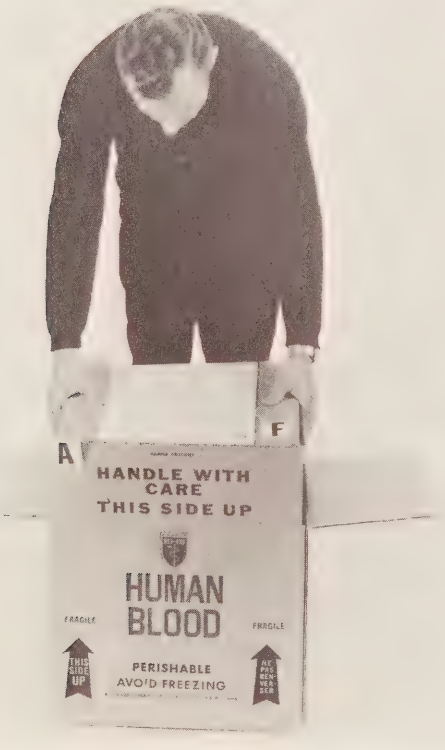
Gummed Tape

Three pieces of gummed tape must be placed on top of the giving set tray. This can be used to reseal the shipping container if it is necessary to re-ice this unit during transit.

USE

1. The component parts of the blood shipping container will be stored unassembled in bundles or boxes of convenient number. They will be stored in regional warehouses and will be shipped along with the other blood collecting supplies, to the Emergency Blood Services Shadow Depots at the time of pending danger.

Illustration no. 24



BLOOD SHIPPING CONTAINER
Closing the insulating packs and insertion of giving sets

Completion of stages 5, 6 and 7 showing the closing of insulating pads and the preparation and placing of giving set tray as outlined on page 40.

Spare parts such as extra ice bags and gummed tape will be maintained at re-icing stations if these stations are needed. The blood bags are stored in vendor's cartons. The giving sets are stored as bulk items in the warehouses. These component parts will be brought together as a complete blood shipping container at the Shadow Depot. They will consist of the component parts mentioned above plus twelve (12) giving sets.

2. The unit will be completely assembled in the shipping area of the Shadow Depot. A porter in the shipping area will complete the shipping address at the top of the box and fill in the space with respect to icing instructions on the end of the box. These shipping containers, with the whole blood and giving sets, will be sent from the Shadow Depots to the medical units by rapid transportation.

SPECIAL INSTRUCTIONS

Assembly Instructions

1. Set up the outer carton by applying gummed paper tape to the bottom flaps in the areas indicated on the carton. See illustration No. 25 (page 41).

2. Insert insulating pads in the carton, paper side in, the long pad first, lengthwise in the carton. Place short pads against the sides. See illustration No. 22 (page 39).

3. Insert blood bag carton (with chilled bags of blood) in the outer carton, taking care not to disturb the insulating pads. See illustration No. 22 (page 39).

4. Insert pre-packed ice tray on top of the blood bag carton according to icing instructions. See illustration No. 23 (page 39).

5. Fold in the insulating pads — the side pads first, then the long pad from the ends.

6. Set up the Giving Sets tray by folding in from both ends, on the creased lines. Secure the folds with gummed paper tape. See illustration No. 21 (page 38).

7. Insert the Giving Sets tray in the carton on top of the insulating pads. Pack 12 Giving Sets in the tray — press tray firmly in place. See illustration No. 24 (page 40).

8. Place three dry strips of gummed paper tape for resealing purposes, (if it is found necessary to open the carton), on top of the tray containing the Giving Sets.

9. Close top flaps of outer carton and secure by applying gummed paper tape to the flaps in the areas indicated on the blood shipping container. See illustration No. 25 (page 41).

ICING INSTRUCTIONS

Blood bags must be pre-cooled to 40°F. Container is pre-cooled either by standing open to a temperature of approximately 40°F., or by filling ice bags with chopped ice, sealing container, allowing it to stand for at least one hour.

Illustration No. 25

BLOOD SHIPPING CONTAINER
Ready for Shipping

The container ready for shipping after the information on top and end has been completed. These are final stages 8 and 9 as outlined on page 40.

Loading

Two polyethylene bags are used. Place one bag inside the other and half-fill with chopped ice (13 to 14 pounds). Seal bag by twisting metal closers several times. Place ice bags in the perforated ice-tray prior to inserting in container. Pull neck of bag assembly through slot of tray flap. Ice is patted evenly inside tray. Remove excess ice if flaps do not close properly. (See other instructions for assembling by steps, for remainder of procedure). Mark time and date of loading and suggested time of re-icing on end of outside container. Local weather conditions will govern the need for re-icing.

Re-Icing

To re-ice remove ice tray, drain water from bag, add chopped ice, follow instructions as in "Loading". Mark time and date re-iced on end of outside container.

Test

This blood shipping container has been given a series of laboratory tests by the Canadian Red Cross Blood Transfusion Service in Toronto. A number of these blood shipping containers have also been used by the Canadian Red Cross Blood Transfusion Service at two of their local depots for transporting fresh whole blood from these depots to hospitals. Both of these tests have proved that this blood shipping container is a very satisfactory method of distributing whole blood in peacetime as well as in time of disaster.

Annex 5

INSTALLATION AND OPERATION OF STERILIZER

INTRODUCTION:

This sterilizer is a special field model developed by Federal Emergency Health Services in conjunction with the manufacturer. The unit is self-contained and set up for use with Propane Gas.

In the initial planning carried out by Emergency Health Services and the Canadian Red Cross Blood Transfusion Service it was decided that it was imperative to have a means of providing immediate sterilizing facilities in order that Collecting Teams could commence operations without undue delay.

For this reason the following items are included with each autoclave:

6-2128 Cylinder, Empty, 40 lb. capacity, Propane Gas: Each 2

Note: The Propane Cylinders will be supplied empty and arrangements will have to be made to fill the cylinders locally.

6-2128/8 Cylinder, Propane, Copper Tubing 1/2 inch O.D. 25 foot Coil with Fittings: Coil 1

6-2128/11 Cylinder Propane, Control Assembly For: Each 1

Comprising:

6-2128/2 Cylinder Propane, Pig Tails For: Each 2

6-2128/3 Cylinder Propane, Automatic Regulator Assembly For: Each 1

6-2128/7 Cylinder Propane, Connector, Male SAE, Flared Tube 1/2 inch I.D. by 1/2 inch SAE Each 1

Note: The above connector is in situ on regulator. The above items are packed in 8-9746 B.S.D. Preparation Area Box No. 2

DIRECTIONS FOR SITING

At the time a building is being selected for use as a Shadow Depot (Chapter IV Page 15), consideration must be given to the location of the "Preparation Room" and the positioning of the sterilizer. As shown in Illustration No. 1 (page 15), this room should be on an outside wall and close to a window if possible. This is essential for the following reasons:

1. It will facilitate venting (see "Installation" in "Operating Instruction and Service Manual" page 14)
2. The 25 foot length of copper tubing, which will be connected to the sterilizer, must pass through an aperture in the wall in order to connect it to the regulator on the cylinders outside the building.

INSTRUCTIONS FOR USE (Propane Gas)

Note: The screwdriver required to open cleated plywood boxes must be obtained from the Pharmacy.

The wrench (12 inch adjustable) required to connect copper tubing, regulators, etc., to sterilizer is to be found in 8-9400 Utilities Box No. 1 (7-600/9).

1. Obtain the following items from

   8-9746 Preparation Area Box No. 2 (colour coded "BLACK")

   6-2128/2 Cylinder Propane, Pigtails For: Each 2

   6-2128/8 Cylinder Propane, Copper Tubing 1/2 inch O.D. 25 foot Coil With Fittings: Coil 1

   6-2128/11 Cylinder Propane, Control Assembly For: Each 1

2. Position outside the building two Propane Cylinders (6-2128) for the sterilizer. Protect from weather but do not enclose.
3. Threaded fittings on the control assembly and pigtail connections are covered with a strippable compound which provides protection to the threads and prevents dust from entering the orifices during storage.

   This coating is easily removed by slitting and peeling. However, care must be exercised to ensure that all the coating is removed, particularly from within the orifice, otherwise the flow of gas will be blocked.

4. Connect the two pigtails (6-2128/2) to the Regulator.

5. Connect one pigtail to each cylinder.

   Note: The pigtails must be bent to allow the regulator to be placed in an upright position.

   CARE MUST BE EXERCISED WHEN BENDING THE PIGTAILS TO PREVENT KINKING

6. Connect the 25 foot length of copper tubing (6-2128/8) to the regulator and then to the sterilizer.

   Note: An access opening for passage of the tubing from the regulator to the sterilizer would be necessary, i.e. a hole drilled through the wall, or through the lower part of a window sash. The tubing could be passed through a partially open window or through an air-vent.

   CARE MUST BE EXERCISED WHEN HANDLING TUBING

   DO NOT KINK

7. MAKE SURE ALL CONNECTIONS ARE TIGHT

8. "OPERATING INSTRUCTIONS AND SERVICE MANUAL FOR STERILIZERS"

The above publication contains full instructions for conversion to electrical power, connection directly to steam supply and for connection to natural gas or mixed gas. All details of installation and operation of the sterilizer are contained in this manual. The manual is packaged with the sterilizer.

Note: The electrical conversion unit requires a 220 or 440 volt AC power supply. (See page 12 for "Wiring Diagram")

CAUTION: A GOOD ELECTRICAL GROUND MUST BE MADE TO ALUMINUM FRAME BEFORE OPERATING ON ELECTRIC POWER.

ITEMS OR SERVICES TO BE OBTAINED LOCALLY

1. **Propane Gas**

   a) Arrangements for filling Propane Cylinders

   b) Stove pipe (see Operating Instructions and Service Manual, page 14)

2. **Electrical**

   Wiring for connection to power supply

3. **Steam**

Piping, connections, etc.

4. **Natural Gas**

   Piping to gas outlet

5. **Mixed Gas**

   See Operating Instructions and Service Manual, page 23 on drilling gas-orifice

6. **General**

   a) Requirements for filling water tanks on autoclave i.e. garden hose, pails and a funnel, etc.,

   b) Piping exhaust steam line to outside vent, if required

   c) Piping from drain to waste line (see "INSTALLATION" on page 14 of Operating Instructions and Service Manual).

Annex 6

ORDERING AND SHIPPING DATA

BLOOD SHADOW DEPOT

Ordering Data
Columns 1, 2 & 3

Shipping Data
Columns 4, 5, 6, 7 & 8

1. Cat. No.	2. Nomenclature	3. Quantity		4. Unit Cu.	5. No. of Pieces	6. Total Cu.	7. Unit Wt.	8. Total Wt.
5-176	Can, Garbage, Steel, 10 Gal.:	ea	18	3.1	18	55.8	24	432
5-454	Pillow, Bed, Feather, Hospital Type:	ea	48	12.0	3	36.0	94	282
5-691	Towel, Hand, Paper, Pkgs of 150:	pkg	100	2.2	4	8.8	32	128
5-692	Towel, Transfusion:	ea	10800	2.0	9	18.0	20	180
6-437/1	Blood and Intravenous Giving Set, EHS App.:	ea	11040	1.1	230	253.0	8	1840
6-438/1	Blood Collecting Dispensing Bag and Donor Set:	ea	11040	.5	230	115.0	16	3680
6-2128	Cylinder, Empty, 40 Lb., Propane:	ea	2	2.9	2	5.8	36	72
6-2128/1	Gas Propane:	Lbs.	80				80	80
7-5	Bed, Hospital, Canvas Deck:	ea	48	23.0	12	276.0	220	2640
7-465	Table, Utility:	ea	24	5.3	8	42.4	94	752
7-599	Sterilizing Equipment, Field:	ea	1	34.6	1	34.6	380	380
8-430	Blanket, Grey, G.S.:	ea	60	4.5	6	27.0	44	264
8-9400	Utilities Box No. 1:	ea	1	5.2	1	5.2	58	58
8-9720	BSD, Collecting Team Box, No. 1:	ea	27	5.2	27	140.4	71	1917
8-9725	BSD, Collection Unit Box, No. 1:	ea	3	5.0	3	15.0	74	222
8-9726	BSD, Collection Unit Box, No. 2:	ea	3	3.2	3	9.6	54	162
8-9727	BSD, Collection Unit Box, No. 3:	ea	3	5.8	3	17.4	94	282
8-9735	BSD, Laboratory Area Box, No. 1:	ea	1	4.5	1	4.5	63	63
8-9736	BSD, Laboratory Area Box, No. 2:	ea	1	4.5	1	4.5	75	75
8-9737	BSD, Laboratory Area Box, No. 3:	ea	1	4.5	1	4.5	66	66
8-9745	BSD, Preparation Area Box, No. 1:	ea	1	4.5	1	4.5	60	60
8-9746	BSD, Preparation Area Box, No. 2:	ea	1	4.5	1	4.5	49	49
8-9747	BSD, Preparation Area Box, No. 3:	ea	1	3.9	1	3.9	57	57
8-9748	BSD, Preparation Area Box, No. 4:	ea	1	4.5	1	4.5	53	53

Cat. No.	Nomenclature	Quantity		Unit Cu.	No. of Pieces	Total Cu.	Unit Wt.	Total Wt.
8-9755	BSD, Shipping Area Box, No. 1:	ea	1	4.3	1	4.3	142	142
8-9760	BSD, Supplies Area Box, No. 1: (Tools)	ea	1	2.5	1	2.5	39	39
11-5840	Refrigerator, Electric:	ea	1	44.0	1	44.0	320	320
13-503	Container, Blood Shipping, Complete:	ea	920	5.8	92	533.6	30	2760
13-503/3	Container, Blood Shipping, Blood Bag, Carton For:	ea	918	7.2	27	194.4	34	918
13-517	Pad, Insulation, 60 x 13-3/8 x 1:	ea	936	5.4	78	421.2	14	1092
13-518	Pad, Insulation, 16 x 14 x 1:	ea	1872	3.1	78	241.8	9	702
13-575	Tape, Gummed Paper 3":	ea	30	1.0	3	3.0	37	111
13-375/1	Tape, Gummed Paper, 3" Dispenser For:	ea	1	1.3	1	1.3	30	30
					849	2537.0		19908

Total No. of Pieces 849
Total Cu. 2537.0 cu. ft.
Total Weight 19908 lbs.

Transportation Requirements:

Freight Car Total Cube: 3800 cu. ft.
Number of Shadow Depots per Car: 1 1/2

Tractor Trailer 45 ft. Total Cube: 2755 cu. ft.
Number of Shadow Depots per Trailer: 1

Truck 60 cwt. Total Cube: 500 cu. ft.
Number of Trucks per Shadow Depot: 6

NOTE: The following items are components of the Blood Shadow Depot Unit and are shipped separately in a frozen state.

Cat. No.	Nomenclature	Quantity	Total No. of Pieces	Total cu Feet	Total Weight
11-B-4101	Serum, Anti A:	369			
11-B-4102	Serum, Anti A B:	369			
11-B-4103	Serum, Anti B:	369			
11-B-4104	Serum, Anti D:	126	14	3.	117 lbs.
	Total No. of Pieces	863			
	Total Cu.	2540 cu. ft.			
	Total Weight	20025 lbs.			

These totals include the above serum.

Annex 7

STORAGE, MAINTENANCE AND SECURITY OF SHADOW DEPOT

PURPOSE

To advise Provincial Emergency Health Services personnel of the storage, maintenance and security requirements for the Shadow Depot.

GENERAL CONDITIONS

With the exception of the propane gas storage location, all areas must be protected from weather damage. Storage areas must be neat, clean and free from fire hazards, dampness and rodents.

The floors must have the following minimum load carrying capacity:

1. In high stacking areas — 500 lbs. per sq. ft.
2. In low stacking areas using power equipment — 500 lbs. per sq. ft.
3. In low stacking areas using mechanical equipment (not powered) — 150 lbs. per sq. ft.
4. In low stacking areas when hand piled — 100 lbs. per sq. ft.

STORAGE CATEGORIES

Three categories of storage are required for the Shadow Depot:

1. Heated
2. Gas
3. Frozen

1. Heated Storage

Heated Storage is required for all items that may be damaged by freezing, rust and mildew. It is preferred that, with the exception of items requiring frozen or flammable storage, all stores for the Shadow Depot should be placed in heated storage. The range of temperature should be maintained in the range 59° to 86°F. (15° to 30°C.). Stores must not be placed too close to heat outlets; suggest they must not be placed closer than three feet to any heat source.

Any items that may be affected by extremes of temperature or direct sunlight should be kept away from exterior walls and any heat source. Certain stores such as beds and tables may be kept in unheated storage areas provided that dampness is not a problem. For a complete list of this type of stores, refer to the storage symbols in the Emergency Health Services Catalogue of Health Supplies.

2. Gas Storage

Storage areas for gases should be isolated from the main storage areas and may even be outside. If inside, the storage area should be in a fire-resistant room which should have safety lights and spark-free fixtures and floors. The area must be well ventilated. Any switches should be located outside the room and be of the safety type.

3. Frozen Storage

Certain items, to remain serviceable for an extended period, must be kept in the frozen state while stored. In the Shadow Depot the blood grouping sera must be kept at below freezing temperatures. A temperature of -4°F. is optimum for this storage.

Note: Blood grouping sera must be thawed to use and then stored in a temperature range of 33° to 43°F.

ADDITIONAL REQUIREMENTS

There must be doors of adequate size leading into the storage area in order that the stores may be easily placed in storage and removed when necessary. It is preferred to have the shipping and receiving doors at four feet from ground level for easy loading or unloading of trucks.

There should be a hard surfaced parking area at the shipping doors which should be kept clear at all times so that trucks may be loaded in all seasons of the year during all types of weather.

There should be access to good roads that are kept open all year.

MAINTENANCE

The storage area and all service components must be kept in good operating condition to maintain satisfactory storage conditions for the care and protection of all items in storage.

Periodic inspections, preferably at maximum three month intervals of all facilities must be made to search for any evidence of leaks, ground seepage, pilferage and deterioration of any of the stores. The freezer at all times and heating services during the winter months must be given more frequent checks (preferably weekly) to avoid loss of stores in the event of a failure of either one.

Inspection of boxes should be made at intervals of six months or less to ascertain if any damage has occurred to the container or contents. Care must be taken at these checks to avoid puncturing the barrier bag (case liner) in all miscellaneous packed boxes.

Emergency Health Services stores must be stored apart from all other stores. They must not be mixed with stores owned by the Province, municipalities or private industry.

SECURITY

Storage areas for Emergency Health Services stores must be secured by lock and key. The key(s) must be in the possession of authorized personnel only.

The building into which the stores are placed should be in a well-lighted and well-policed area. The responsible Law Enforcement Agency should be made aware of the location and layout of the stores. The names of one or more responsible persons should be left with the police to be contacted in the event of a break-in, vandalism, etc.

If possible, any glass in windows or doors should be covered by a mesh (1 inch) of 14 gauge steel secured by bolts.

RESPONSIBILITY

The responsibility for the care and protection of Federal Government property rests with the provinces as stated in the agreements between the Provinces and the Federal Government concerning Emergency Health Services stores. In the event of a break-in or damages to the stores it is the responsibility of the person finding this to notify the responsible Law Enforcement Agency and the Provincial Health Supplies Officer immediately.

The Director of the Provincial Emergency Health Services should send an account of any incident that results in loss or damage to Emergency Health Services stores to: Chief, Emergency Health Services, Department of National Health and Welfare, Ottawa, Ontario, as soon as possible.

Annex 8

100 BLOOD DONOR PACK

Cat. No.	Nomenclature	Quantity	
1A-561/1	Label, Blood Bag, Group AB, Bilingual:	Each	100
1A-561/2	Label, Blood Bag, Group A, Bilingual:	Each	100
1A-561/3	Label, Blood Bag, Group B, Bilingual:	Each	100
1A-561/4	Label, Blood Bag, Group O, Bilingual:	Each	100
1A-561/6	Label, Blood Bag, RH Negative, Bilingual:	Each	100
1A-1000	Vial, Glass, Flat Bottom, 15/16 inch O.D. by 3-11/16 inch long:	Each	2
5-20	Applicator, Wooden, 6 inch, 72 dozen:	Box	1
5-692	Towel, Transfusion, Absorbent, Non-Sterile, Folded, 6 3/4 inch by 6 3/4 inch:	Each	100
6-437/1	Blood and Intravenous Solution Giving Set, Sterile and Disposable, EHS Approved:	Each	100
6-438/1	Blood Collecting-Dispensing Bag and Donor Set, With Anticoagulant, 450 cc:	Each	102
6-438/2	Blood Collecting-Dispensing Bag and Donor Set, Hand Sealing Instrument For:	Each	1
6-438/3	Blood Collecting-Dispensing Bag and Donor Set, Clip For:	Each	1,200
6-438/4	Blood Collecting-Dispensing Bag and Donor Set, Hook For:	Each	12
6-438/5	Blood Collective-Dispensing Bag and Donor Set, Scale Collecting For:	Each	4
6-438/6	Blood Collecting-Dispensing Bag and Donor Set, Scale Administering For:	Each	12
6-5870	Scissors, Bandage, 5 1/2 inches, Lister's:	Each	2
8-820	Form, Donor Registration Sheet: (Bilingual)	Each	4
11-1472	Bulb, Rubber, Capillary Pipette Filling:	Each	5
11-4275	Lancet, Sterile, Blood Letting, Disposable Type:	Each	125
11-5515	Pipette, Capillary, 0.8 mm by 56 mm:	Each	125
11-5517	Pipette, Disposable, Pasteur's, 7 mm by 6 inch:	Each	3
11-5517/1	Pipette, Disposable, Bulb 1 cc Rubber:	Each	3
11-5775	Plate, Glass, Opaque, White Carrara, Polished Edges, 7 1/2 inch by 4 inch by 11/32 inch Thick:	Each	3
11-6773	Support, Test Tube, Wooden, Forty-Five (45) Test Tube Capacity:	Each	3
11-6791	Support, Wooden, for Copper Sulphate Test:	Each	2
11-6964/1	Tube, Blood Collecting, Vacutainer, 7 cc, 50s:	Tin	2
11B-953	Copper Sulphate Solution, sp gr. 1.053, 220 cc Bottle:	Each	2
11B-4101	Serum, Blood Grouping, Anti A:	Vial	1
11B-4103	Serum, Blood Grouping, Anti B:	Vial	1
11B-4104	Serum, Blood Typing, Anti RHO (Anti D):	Vial	1
13-535	Rubber Stamp, Dating Style:	Each	1
13-535/1	Rubber Stamp, Dating Style, Inking Pad Black 4 1/4 inch by 2 3/4 inch:	Each	1
13-535/2	Rubber Stamp, Dating Style, Ink Black:	Btl.	1